IEEE STANDARDS

Starlan in 802 review

BY JOHN DIX
Senior Editor

A low-cost, 1M bit/sec Ethernet-type local network that works with telephone twisted-pair wire and closely resembles AT&T's Starlan net will run the standards gauntlet July 29 when the IEEE 802.3 committee convenes in Brighton, England.

The committee will also consider a second proposal that would set a standard for fiber-optic repeaters used in 802.3 Ethernet-type local networks.

The working groups that drafted these nascent standards will submit their work to the full 802.3 committee at the July meeting. If approved, the specifications will be presented to 802.3's parent committee, the IEEE Project 802, which will initiate a letter ballot seeking comments on the proposals.

See **802.3** page 35

STATE NETWORKS

Texas steers net future

BY BOB WALLACE
Senior Writer

Last in a three-part series.

AUSTIN, Texas — Facing a precipitous $2 billion decrease in oil revenue and the termination of a unique low-cost, long-distance service contract, one state agency here has formed a steering committee charged with charting the future of the state's communications networks.

Unlike other energy-dependent states, such as Alaska and Utah ("Alaska chops expenses," *Network World*, June 30 and "Utah belt-tightening moves squeeze $1.3m in savings," *Network World*, June 23), Texas has yet to make

See **Texas** page 34

NETWORK WORLD
THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES VOLUME 3, NUMBER 18 JULY 7, 1986

LOW-END PBX

AT&T System 25 targets Redwood

Switch supports data links, analog phones.

BY JOHN DIX
Senior Editor

NEW YORK — AT&T Information Systems is hoping to trump rival switch maker Rolm Corp. with the data support features of its System 25, a low-end private branch exchange the company announced here last week. Rolm gambled that data support is not a feature desired by customers in this market segment when it introduced the Redwood digital switch last month.

AT&T's System 25 is a digital switch that supports a mix of between 40 and 200 telephones and up to 104 trunks. Total switch capacity is 240 ports. The system is nonblocking for 115 simultaneous voice links or 19.2K bit/sec asynchronous data links (see chart at right).

Line costs for the System 25 run between $550 and $750. In comparison, Redwood line costs range from $600 to $800.

The markedly different strategies embraced by the giant switch makers illustrate an interesting dichotomy in market

See **System 25** page 38

The low-end PBX game
AT&T and Rolm square off

AT&T System 25	System capability/constraints	Rolm Redwood
40-200	Number of stations	16-144
104	Maximum trunks	48
115	Simultaneous connections	92
Digital	Switch technology	Digital
Yes	Universal slots (Line card/trunk)	No
	Data connectivity	
Yes	Circuit switched (19.2K bit/sec asynch)	No
Yes	Modem pooling	No
Yes	Console direct station selection/busy lamp field	No
Yes	Analog telephone	Off premises Station only
No	Digital telephone support	Yes

NETWORK LINE

News

Participants in upcoming ISDN trials are eager to cut communications costs and enhance services. They're also excited about being on the cutting edge of communications technology. Page 2.

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ITT Corp. reaches an agreement with France's Compagnie Generale d'Electricite to combine their strengths in a joint European venture. The new organization will be the world's second largest telecommunications company. Page 2.

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At PC Expo this week, Novell will unveil a deal through which it will provide PC interface boards from Micom-Interlan. Page 2.

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The still-maturing T-1 market thins out as Digital Communications Associates swallows Cohesive Network Corp. for $28 million. Page 3.

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Lockheed is sporting fiber-optic cable instead of coaxial to link voice and data equipment in its new corporate headquarters. Page 4.

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A growing number of users are discovering they can snag big savings if they don't rely on long-haul carriers for end-to-end connections. AT&T's coordinated access service lets users cut costs and still avoid the responsibility of net management. Page 6.

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Features

Microcomputers are moving into the big leagues, sharing data with mainframes and becoming an important component of the corporate network. Page 24.

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Easy to install, operate and maintain, fiber optics becomes the leader of the pack for metro net applications. Page 31.

NEWSPAPER

FEATURE FOCUS

Fiber-optic forecast: future less cloudy

The climate is improving for fiber local-area networks.

BY ROBERT W. REINHOLD
Special to Network World

Current standards for fiber-optic communications are cloudy, but early signs indicate a bright forecast for this emerging technology. Fiber-optic cable is attracting more attention than any other transmission medium on the market, and for good reason. The noise immunity, security and high bandwidth that fiber offers make it an attractive medium for high bandwidth local-area network

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▶ PC EXPO

Ethernet links bolstered

Novell to market Micom-Interlan board.

BY MARY PETROSKY
West Coast Correspondent

NEW YORK — In an effort to provide more price-competitive Ethernet products, Novell, Inc. is expected to announce at this week's PC Expo here that it will be marketing Ethernet personal computer interface boards from Micom-Interlan, Inc. of Boxborough, Mass.

Novell already markets 3Com Corp.'s Etherlink Plus boards, which it recommends for use in its servers, according to Craig Burton, vice-president of corporate marketing and development.

The Interlan 5010 board, priced at $650, is compatible with the 3Com Etherlink boards, Burton claimed.

As a result, users running Novell's Advanced Netware will be able to use Interlan boards in place of Etherlink boards or in conjunction with them. Novell will also offer the Interlan boards bundled with Advanced Netware in a system starting at $2,795.

Novell is also looking at other suppliers of Ethernet-compatible interface cards, hoping to find a less expensive product, Burton said.

▶ X.400

NBS, COS join forces

BY MARGIE SEMILOF
Senior Writer

WASHINGTON, D.C. — The X.400 Special Interest Group of the National Bureau of Standards (NBS) last week sent a final draft of the X.400 Message Handling Standard (MHS) protocol to the Corporation for Open Systems (COS) for approval. If the proposal clears COS, it will mark the first time the group composed of vendors and users has successfully collaborated on a product specification based on a standard.

The MHS protocol defines a common interface that lets users issue documents between different types of communications systems and network services.

Karl Litzenberg, vice-president of information services at COS, said the acceptance of the X.400 protocol will create a generation of interoperable message-handling systems that are no longer dependent on black boxes to forge links. "All protocols will be identical as long as vendors are basing their products on the X.400 product specification," Litzenberg said, adding that, based on COS approval, NBS could OK the protocol as early as July 24.

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Users need not wait for emerging standards to buy a local net fiber system. **Page 1.**

▶ FUTURE TECHNOLOGIES

Participants in upcoming ISDN trials raring to go

BY MARY PETROSKY
West Coast Correspondent

Participants in Integrated Services Digital Network trials scheduled to begin later this year are eager to learn whether the all-digital technology will help them cut costs and enhance their communications services. But beneath that bottom-line sobriety, communications managers share excitement at finding themselves on the cutting edge of technology.

"Almost every industry is looking at how ISDN is going to control communications costs and provide users with added value," said Emil Karau, manager of telecommunications networks at Honeywell Information Systems, Inc.'s Large Computer Division in Phoenix. Honeywell is one of several organizations in the Phoenix metropolitan area slated to participate in ISDN trials to be held in the fall by Mountain Bell.

Honeywell is typical of trial participants who are looking at ISDN as a way to reduce the number of lines that they now use. Users are also counting on ISDN for combining voice and data and for improving data transmission speed. With the Bell operating companies and participating vendors supplying all the necessary equipment, trial users have an almost risk-free opportunity to learn about ISDN firsthand.

The main burden involved in participating in such trials, users told *Network World*, is the time and personnel they will have to contribute. ISDN trial participants said they would continue operating existing communications networks as a backup to the ISDN technology during the pilot tests.

Learning the realities of ISDN

"There is so much conflicting information on what ISDN is and is not. The trial is a chance for us to learn what the realities of ISDN

See **ISDN** page 8

▶ INDUSTRY MOVES

ITT seals deal with CGE

BY KARYL SCOTT
Washington, D.C. Correspondent

NEW YORK — ITT Corp. and Compagnie Generale d'Electricite (CGE) of France announced last week that they have agreed to form a joint European telecommunications and office automation venture that would be the world's second largest telecommunications company after AT&T. The new firm will have estimated annual revenue of $9.6 billion. The joint venture is subject to the approval of the French government, which owns CGE. ITT officials said they expect the sale to be approved by the end of July.

Under the terms of the agreement, ITT said it will receive $1.8 billion from CGE, including some $350 million in debt to be payed by the as-yet-unnamed new company.

ITT will own 30% of the new venture. The remaining 70% will be owned by a European holding company that will likely consist of CGE, Societe Generale Belgique of Belgium and Telephonica of Spain. The new company will be active in 75 countries. Included in the deal were ITT's telecommunications equipment, computer, printer, U.S. transmission and European consumer products businesses. The new company will comprise ITT's holdings in Europe, the U.S., Africa, the Middle East, Latin America, Canada and Asia.

CGE will contribute all of its Alcatel telecommunications business, which is active in 53 countries.

ITT's most prominent telecommunications product is the System 12 central office switch, which sold relatively well abroad but failed to win acceptance in the U.S. Last February, ITT withdrew it from the U.S. market. ITT's failure to penetrate the U.S. telecommunications market is cited as a major reason behind the sale. The high cost of remaining technologically competitive is another.

"This sale gives ITT lots of cash to play with, although the sale price was low," said Frank Dzubeck, president of Communications Network Architects. "The low price says ITT wanted out badly. It seems like a healthy thing for both companies though," he said.

ITT officials say the company remains committed to its products and the telecommunications business. "Through our ownership, participation and involvement in the new venture, we reaffirm our commitment to System 12 both in Europe and in our important export markets," said Rand V. Araskog, ITT chairman.

Commenting on the CGE/ITT alliance, telecommunications analyst Fritz Ringling of the Gartner Group said, "There is a latent pressure in the European Community to reduce the number of telecommunications vendors. We will see more of these joint ventures as economic and technological pressures increase." In separate but related news, ITT announced its domestic long-distance unit has added five new cities to its private line network. The five are: Syracuse, Albany and Buffalo, N.Y.; Miami; and Raleigh, N.C.

▶ TAKEOVERS

DCA widens its piece of the T-1 pie

Atlanta firm swallows Cohesive Network Corp. for $28 million; emerging T-1 market is moving toward consolidation.

BY PAUL KORZENIOWSKI
Senior Editor

ATLANTA — The still-emerging T-1 multiplexer market took its first step toward consolidation last week when Digital Communications Associates, Inc. (DCA) here purchased Cohesive Network Corp., based in Los Gatos, Calif., for approximately $28 million.

Analysts have predicted robust growth in the young T-1 multiplexer mart, which picked up steam in the early 1980s when AT&T slashed T-1 line tariffs.

Despite the optimistic projections, analysts said too many companies (approximately 30) are currently trying to carve out a slice of the T-1 market. Gerald F. Mayfield, vice-president at DMW Group, Inc. in Stamford, Conn., said ultimately only two to four companies will emerge as dominant players.

Cohesive had been repeatedly mentioned as a takeover candidate. The company, formed in 1982, has been fueled by infusions of venture capital. Last June, the company announced its first offering, the CN-1, which could support up to 16 T-1 lines.

> *“Analysts predict robust growth in the T-1 mart.”*

Cohesive signed an exclusive distributor agreement with General Datacomm Industries, Inc. (GDC), based in Danbury, Conn. Recently, reports of a rift between the two companies have surfaced. John A. McGuire, Cohesive president and chief executive officer, said the exclusivity portion of the Cohesive-GDC agreement was terminated last month.

“The exclusivity agreement stipulated that General Datacomm sell a certain number of our products,” he said. “General Datacomm did not meet its projections.”

Responding to McGuire’s remarks, Charles Johnson, chairman of GDC, said, “The exclusivity was not canceled due to to a lack of performance on the part of GDC.” He went on to say that a new agreement between the two companies was signed at the end of last month. Under that new agreement, GDC will continue to market Cohesive products to existing and new accounts until such time that certain conditions in the relationship between Cohesive and DCA have been met.

Johnson would not discuss details of the conditions, but said they would trigger a change in the GDC-Cohesive arrangement that would terminate GDC’s selling Cohesive products to new accounts.

However, he stressed that GDC will maintain its current Cohesive accounts.

McGuire said several companies were involved in the bidding for Cohesive. “The companies came to us,” he said. “We were not out looking to be bought.” The sale to DCA is expected to be finalized in August, and both companies reported that no organizational changes are envisioned.

DCA will take over the sales and service functions for Cohesive. Cohesive said that 15 networks and 90 CN-1 nodes have been installed at such user sites as Metropolitan Life Insurance Co., General Electric Co. and GTE Corp.

Deep pockets were needed to expand Cohesive’s market. DCA does indeed have very deep pockets, with a reported cash reserve of $90 million. Bertil D. Nordin joined DCA as president in 1980. Primarily through Nordin’s acquisition policies, the company has grown from $5 million in sales to $100 million.

One purchase was particularly fruitful. DCA acquired its noted Irma line of microcomputer-to-mainframe links when the company purchased Technical Analysis Corp. in 1983. The Cohesive purchase expands DCA’s line of communications offerings. In addition to the Irma line, the company sells packet-switching devices, statistical multiplexers and a point-to-point T-1 multiplexer. ◘

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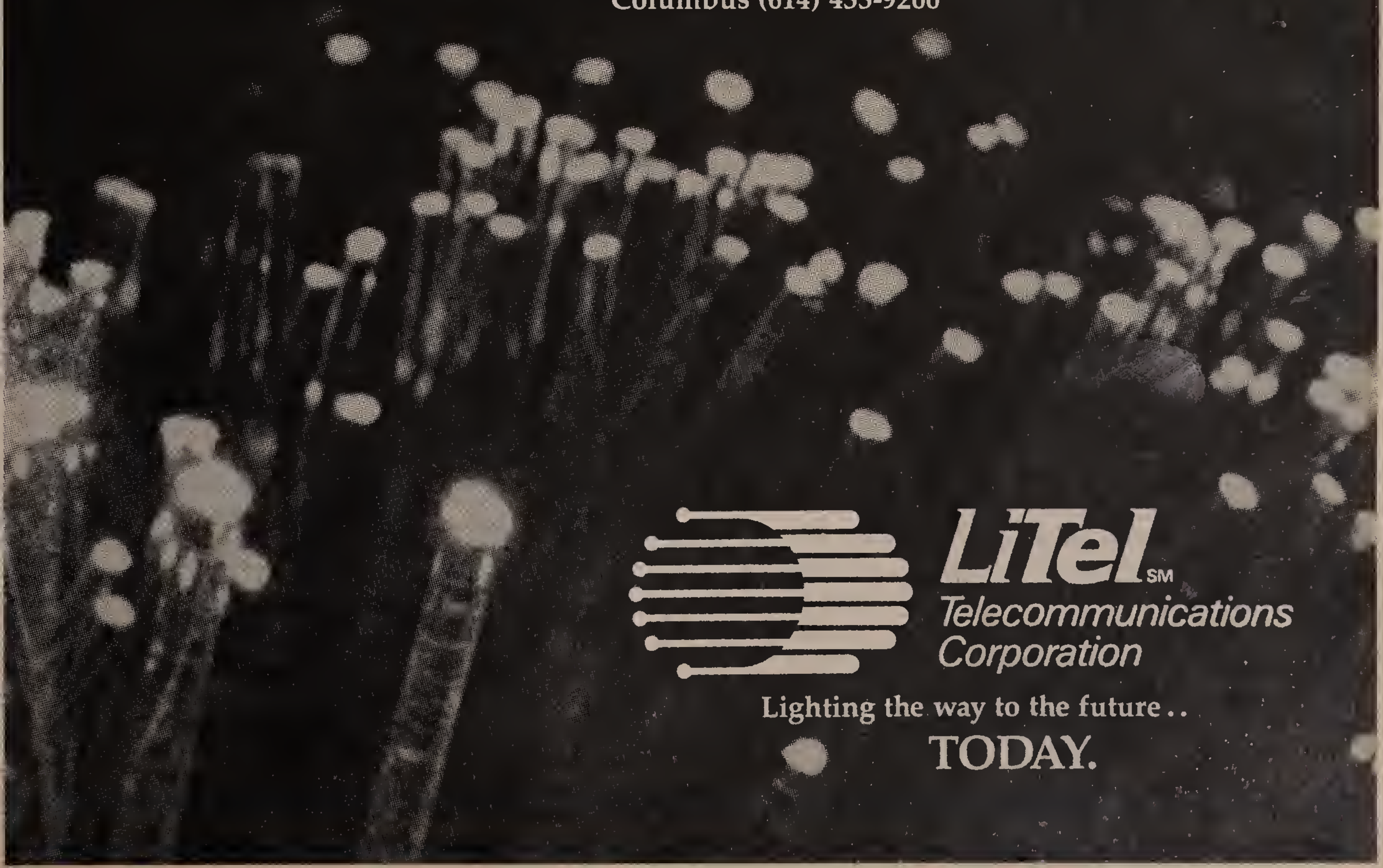

▶ ADCU

Users interested in here and now

BY MARGIE SEMILOF
Senior Writer

ATLANTIC CITY, N.J. — At the Association of Data Communications Users' (ADCU) annual meeting here last week, users expressed more interest in network management and meeting their companies' current communications needs than in congressional policy-making battles or the formation of standards.

While conference attendees said they were interested in both the activities and the ultimate success of the Corporation for Open Systems, none said their companies planned to join the standards watchdog group — which demands a hefty yearly contribution of at least $25,000 per member.

COS recently expressed its intention to increase the number of user company members ("COS beckons to users," *Network World*, June 30). But many ADCU attendees said they feel user companies will have a smaller voice than vendor members in the standards-steering body. "I doubt users can play a significant role in such an organization," said Henry Broeder, director of data communications planning at the East Orange, N.J.-based American International Group Data Center, Inc.

"I wouldn't recommend that a user join," Broeder added. "For IBM or Digital Equipment Corp., the membership fee is not a high price to pay for influence on standards decisions. But COS is going to have a tough time getting those vendors to work together on the same floor."

Jeffrie Chirchirillo, technical officer for the First National Bank of Chicago, said the primary reason he attended the ADCU conference was to find a method of tying together the various components of the bank's decentralized communications network.

"I am here to look for options to the packet network we recently installed in one part of the bank. It didn't work out as well as we would have liked, so I am investigating other methods," Chirchirillo said.

In his keynote address, U.S. Rep. Matthew Rinaldo (R-N.J.), a House telecommunications subcommittee member, told conference attendees that the passage of any major telecommunications legislation is unlikely this year. This includes Sen. Robert Dole's (R-Kan.) recently introduced Federal Telecommunications Act of 1986, which would transfer jurisdiction of communications regulation from a U.S. District Court to the Federal Communications Commission.

Rinaldo said legislative progress on communications issues would be hampered because congress' attention is focused on other key topics, including the federal budget and much-publicized tax reform.

Rinaldo said the transfer of communications policy rule-making responsibility from the Justice Department to the FCC would be appropriate because of the agency's access to technological expertise.

Rinaldo said most congressmen rely solely on the expertise and opinions of telecommunications subcommittee members. The subcommittee members rely on input from the user community. ◪

▶ USER INNOVATIONS

Lockheed opts for fiber optics

Glass beats out coaxial cable in headquarters installation.

BY BOB WALLACE
Senior Writer

CALABASAS, Calif. — Lockheed Corp. opted to install fiber-optic cable instead of coaxial cable both within and outside its recently completed three-story corporate headquarters facility here.

The company's voice and data communications equipment is connected to a local Pacific Bell central office via a multimode fiber-optic cable that, according to a company spokesman, offers roughly 9.3M bit/sec capacity. Fiber-optic cable is also used to connect more than 800 workstations within the building to the first-floor data processing center.

Fiber-optic cable has often been branded as too expensive for short-distance data communications applications. But Jack Fetzer, corporate communications services director for Lockheed, disagreed.

Fetzer, a former senior advisor with the International Communications Association, claimed the expense of installing fiber-optic cable here was roughly equal to what it would have cost to wire the facility with coaxial cable.

"We didn't find fiber-optic cable to be excessively expensive. In fact, the price of fiber-optic cable has dropped dramatically in the last year," he said.

Fetzer said the fiber link that connects the building to the local central office handles the company's data traffic and all telephone calls routed through a Rolm Series 8000, a version of the switch manufacturer's CBX II private branch exchange. A pair of conference rooms have also been wired with fiber to support future video teleconferencing applications, he noted.

"The fiber circuits used to carry telephone calls are so clear that, during a conversation, if there is a pause, the other party will ask if the speaker is still on the line because there is absolutely no noise," Fetzer said. Such noise is common on voice circuits that use either twisted-pair wire or microwave facilities. Each telephone in the Lockheed facility is connected to the Rolm PBX with single-pair, twisted-pair wire.

Data terminals on each of the building's three floors are connected to wire closets using IBM's Type 2 Cabling System cable. These cables are connected to a fiber-optic multiplexer, which routes all data traffic over fiber cable to a second multiplexer located in the first floor DP center. The second multiplexer relays the data to the appropriate computer. Optical Data Systems of Richardson, Texas, provided the fiber-optic multiplexers for the project.

> *"Fiber-optic cable has often been branded as too expensive."*

"The basic purpose of using fiber-optic cable in this application is to avoid having to run several hundred coaxial cable links from the wiring closet to the computers," Fetzer explained.

The installation of the wire in the 290,000-square-foot building was completed last month by an outside firm. "Our staff generally doesn't handle wire installation," Fetzer said. "We believe outside contractors have more experience with these tasks than we have."

Fetzer said there are several advantages to using fiber-optic instead of coaxial cable. "Fiber requires less physical space, provides quieter circuits and is easier to handle than coaxial cable." Lockheed's facility here currently uses roughly 12 miles of the lightwave transmission medium.

The communications services director advised other users considering fiber-optic cable for voice or data applications to ignore the oft-bandied shortcomings of the technology. "Fiber-optic technology has matured. We would not have tried to use fiber-optic cable three years ago, but it is working very well for us now," he said. ◪

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Second-class postage paid at Framingham, MA, and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue the last two weeks in December by CW Communications/Inc., 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests.

Non-qualified subscribers: $3.00 a copy; U.S. — $65 a year; Canada, Central & South America — $110 a year; Europe — $165 a year, all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin.

Four weeks notice is required for change of address. Please include mailing label appearing on front cover of the publication.

Network World can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zebb Road, Ann Arbor, Mich. 48106.

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"ABC membership applied for"

ABP

▶ LINKING LANS

Net chasm still yawns

BY MARGIE SEMILOF
Senior Writer

Last in a three-part series.

The future of linking local-area networks rests to a great extent on the ability of manufacturers to create transparent connections between networks — regardless of the network operating software.

Lack of applications software compatibility has been the biggest hindrance to the linking of local-area networks through currently available bridges and gateways. Frank Dzubeck, president of Communications Network Architects, a Washington, D.C.-based consulting firm, said users often try to create integrated applications by transferring information between networks. In most cases, however, the application is not designed to handle such data sharing.

"In one situation, the network was moving too much data across the link," he said. The application was unable to process the data load efficiently. "This little problem took six months to find. It wasn't in the Ethernet, token ring or the gateway. It was the application that caused the problem."

Most link products connect to IBM Systems Network Architecture environments using an SNA interface. "All the linkages are IBM," he said. "No one wants to build a [Digital Equipment Corp.] Digital Systems Architecture interface. They want to build SNA interfaces."

When completed, the International Standards Organization's currently unfinished Open Systems Interconnect model will be a cornerstone for building products that are able to link two non-IBM systems.

Awaiting the era of standards-conforming architectures, a growing number of corporations are planning to link networks through virtual network servers from companies such as Banyan Corp. or through corporate backbone networks built around broadband or fiber technology.

Virtual network servers act as gateways connecting local nets of different types. Devices on the networks can share peripherals through the server. But virtual servers have their limitiations. Although some servers today are capable of supporting different types of networks, typically they can only accommodate one or two operating systems. For instance, Banyan can support local networks from IBM, Orchid Technology, Inc., Corvus Systems, Inc. and others. But the devices attached to each network have to be PC-DOS or MS-DOS compatible.

The huge capacity of broadband backbones could enable users to tie local nets together through a common channel. A backbone allows users to connect, for example, baseband Ethernets through broadband facilities, and gateway to other local- and wide-area network systems.

Conversion products that connect dissimilar operating systems can be installed anywhere on broadband local nets to gateway between local networks implemented on different frequencies.

Bob Morgan, manager of computing and communications services for San Francisco State University, said the university plans to build a broadband backbone network to link its 3Com Corp. networks to a Bridge Communications, Inc. server and to several public networks. Morgan is installing gateways throughout the facility to several Ethernets. The Ethernets will also connect to California State University's X.25 network.

Morgan said the drawbacks of building such a system are the high cost of gateway products, the shortage of local net security features and the lack of vendors using the Transmission Control Protocol/Internet Protocol (TCP/IP).

"Most universities use TCP/IP, but most local net vendors stick with protocols such as Xerox XNS," Morgan said.

▶ NETWORK MANAGEMENT

Tandem gets PacBell tool

BY MARY PETROSKY
West Coast Correspondent

SAN FRANCISCO — Pacific Bell and Tandem Computers, Inc. last week signed a distribution agreement through which Tandem will sell a network management program that Pacific Bell originally developed for use within its own network.

The Localized Intelligent Network Control (Linc) program is an on-line, interactive system that runs on Tandem processors and provides network management by polling remote front-end processors.

Pacific Bell developed the program in order to manage better the mix of network processors in its own network and has employed Linc for seven months, said Eileen Starr, Pacific Bell project manager.

Linc's key feature is its ability to interface to network processors from multiple vendors and provide users control of various networks from one console. This removes the need to have dedicated administration terminals for each front-end processor, Starr said.

"Each vendor has its own processor and control terminal, and you are often stuck with the vendor's method of handling network management," she added.

Pacific Bell sees Linc aiding other telecommunications companies, as well as banks, sales organizations and businesses with extensive and disparate data networks. The program would be suitable for "any corporation that has more than one data center and multiple processors from more than one vendor," Starr said.

In addition to being able to enter commands requesting information from any processor from a centralized console, Linc also logs all data it collects to a disk drive rather than a printer, Starr said.

This allows users to scan logs and search for specific types of events, such as outages. The software can also generate and analyze reports and systems logs.

Linc can monitor and pinpoint alarms for any processor or component on the network. Starr highlighted the fact that Linc automatically searches for alarm conditions and displays these in graphic form on a terminal or personal computer. Other management tools often mix alarm messages in printouts with general information, such as system utilization and user statistics, making it difficult to identify alarms, she said.

As an on-line system, Linc allows users to make changes to their networks without bringing them down. The program is fault-tolerant in conjunction with Tandem's computers and has security features for specifying what level of network control is available to an operator.

> *"Linc can monitor net alarms."*

Pacific Bell currently has interfaces to six network processors, including NCR Comten, Inc.'s 3690, Amdahl Corp.'s 4410 switch and Control Data Corp.'s Cyber 1000, Starr said.

Pacific Bell is licensing Linc and has made pricing dependent on the size of the user's networks and the number of different processors used. The Bell operating company will develop additional interfaces for other processors upon user demand, Starr said.

Although Tandem will include information on Linc in its sales literature, all purchases and support for the software will be handled by Pacific Bell. The program is written in Tandem Cobol and Pathway and can run on Tandem Nonstop II, Nonstop TXP, Nonstop VLX and Nonstop EXT computers.

▶ COST CUTTING 1

Playing the tariffs

Seminar offers users cash-saving tips.

BY MICHAEL FAHEY
Staff Writer

WASHINGTON, D.C. — "We have saved $400,000 a year on our network by playing the tariffs. That's just the tip of the iceberg."

Moreover, said Norm Tolson, data communications manager for the Baltimore-based Commercial Credit Corp., "There's a world of opportunity out there.

"But you have to find the savings that are buried deep in the tariffs," he added.

Tolson and other communications managers in search of network savings attended a seminar conducted here last week by The Aries Group, Inc., a Rockville, Md.-based firm that offers tariff analysis products and services.

Robert Ellis, president of Aries, led the group through two full-day sessions designed to familiarize users with local exchange carrier bridging, special access tariffs and other cost-saving measures.

While none of the communications managers surveyed at the seminar by *Network World* reported savings comparable to those realized by Tolson, they all stressed the importance of understanding today's rapidly changing tariffs.

"Tariffs are very complicated, and keeping up with the changes is really difficult,"said Larry Latvis, senior tariff and pricing analyst for General Electric Co.

"But even savings of a fraction of a cent per minute adds up when you are operating a big network," he added.

Jeff Longstaff, telecommunications engineer for Electronic Data Systems Corp. of Southfield, Mich., said that many communications professionals who previously concerned themselves with more technical issues are now becoming aware of the importance of understanding tariffs.

"We want to understand all of the tariff considerations before we build a network," Longstaff said.

EDS, a subsidiary of General Motors Corp., is currently designing the automaker's new corporate network.

Monitoring tariffs a must

The need to monitor tariffs and the rapidly changing nature of today's postdivestiture communications industry was underscored by officials of interexchange and local exchange carriers who attended the seminar.

Ed Warner, executive vice-president of Aries Group, said more than half of the nearly 50 communications professionals attending the seminar worked for telephone companies.

See **Users** page 34

▶ COST CUTTING 2

Special AT&T service can trim line fees

BY MICHAEL FAHEY
Staff Writer

WASHINGTON, D.C. — Communications managers who want to cut network costs without assuming total reponsibility for maintaining private lines should consider AT&T's coordinated access service, according to network optimization and tariff expert Robert Ellis.

Ellis, speaking at The Aries Group, Inc.-sponsored seminar here last week, said a growing number of users are realizing they can pocket big savings if they do not rely on long-haul carriers for end-to-end connnectivity. The users are instead contracting with local exchange carriers for the local portion of long-distance lines. But, Ellis pointed out, users who opt to arrange their own local service must be willing and able to manage, maintain and control their networks ("Tromping tariffs," part two, *Network World*, May 5). The seminar addressed the impact of postdivestiture tariffs on large networks.

Users who take advantage of coordinated access service, however, can leave network management and maintenance to AT&T, Ellis said. In return for a $9.30 monthly charge per drop, plus a one-time charge of $145 per drop, AT&T will assume end-to-end responsibility for the user's coordinated access lines, after the user has specified with its local phone company the local network connections.

This option is cheaper than AT&T total end-to-end service, yet it provides the user with the same network management and maintenance provisions. In a sample data circuit, the coordinated access option provided users with a $117 per line per month saving compared with AT&T end-to-end service.

"Choosing the proper network design depends on your particular situation and organizational goals," Ellis told the group of communications professionals attending the two-day seminar.

For more adventurous network managers willing to take total responsibility for their networks, Ellis explained such money-saving techniques as local exchange carrier bridging and the use of special access tariffs.

"Designing a network is a lot like building a house," Ellis said. "You can act as your own general contractor and hire people to put the pieces together."

That is the approach taken by users who assume end-to-end network responsibility, Ellis explained.

▶ SATELLITE SYSTEMS

User employs second Vsat net

BY BOB WALLACE
Senior Writer

ST. LOUIS, Mo. — Bridge Market Data, a provider of real-time securities and commodities information, recently became the first user in the nation to implement its second two-way, very small aperture terminal network. The Vsat networks, supplied by competing vendors, will help Bridge slash its communications costs by between 20% and 30% annually.

Last month, Bridge signed on as a subscriber to Equatorial Communications Co.'s Equastar Satellite Transaction Network ("Two Vsat units launched," *Network World*, June 2) to transmit real-time, last-sale information and historical price data on stocks, options and commodities to 25 companies that subscribe to Bridge's services. Subscribers include users such as brokerage houses, banks and other financial institutions.

Bridge in February inked a pact, valued at $4.9 million, with Telcom General Corp. for an 800- to 1,000-site Vsat network.

Bridge's actions are unique because most large corporations have adopted a wait-and-see attitude toward Vsat technology. Most users have been content to scrutinize the experiences of the roughly one dozen corporations currently pioneering single-vendor, interactive Vsat networks. Buford Smith, president of Bridge Market Data's communications subsidiary, said the two Vsat nets will not be interconnected.

Smith said Bridge chose Equatorial to provide the 25-site system, which will be owned and operated by the satellite service and equipment vendor, because Bridge wants to stay abreast of Vsat technology. "We wanted the opportunity to evaluate what other Vsat vendors are doing," Smith explained. "We feel Vsat technology is changing rapidly. We wanted to have a working relationship with a second Vsat vendor."

The Telcom General Vsat system will replace a substantial number of private lines Bridge had leased from AT&T. "We will always lease terrestrial facilities, but the mix will certainly be weighted more toward satellite channels than terrestrial channels after the Telcom General network is completed," Smith forecasted.

Smith said the Telcom General Ku-band network equipment will enable remote users to request historical and other information on equity stocks. The requested information would then be transmitted from the St. Louis location to the query site. The same system will also be used to broadcast commodity information to more than 300 subscriber locations. This portion of the Telcom General system will replace SAT-Net, a one-way information broadcast service offered by the Associated Press.

The Equatorial C-band network will link remote terminals located at 25 subscriber sites to a mainframe computer in the company's data processing center. Users at the remote sites will be able to access the central data base for historical financial information and a variety of graphics.

Equatorial will operate the Vsat network and will charge Bridge $290 per site every month for the 25 Vsats, satellite transponder capacity and on-site maintenance services.

Sites equipped with Telcom General equipment can transmit information to the satellite at 9.6K bit/sec and receive information at 56K bit/sec. Sites equipped with Equatorial equipment will be able to transmit data at 9.6K bit/sec and receive at 19.2K bit/sec.

▶ TELEPHONE COMPANIES

Depreciation ruling may spur rebate

BY JIM BROWN
New Products Editor

OLYMPIA, Wash. — A battle is brewing here between the state attorney general's office and Pacific Northwest Bell that could lead to refunds to users totaling between $73 million and $100 million.

The battle is part of the continuing fallout from a recent U.S. Supreme Court decision that gave authority for setting local telephone company equipment depreciation schedules to state public utility commissions rather than the Federal Communications Commission ("Supreme Court curbs FCC rule over PUCs," *Network World*, June 2).

At issue here is whether Pacific Northwest Bell should refund to users a portion of the revenue it collected from higher rates instituted in 1983. The rate hike resulted, in part, from the imposition of FCC-mandated accelerated equipment depreciation schedules. Pacific Northwest Bell recently warned that users may ultimately wind up paying $2 for every $1 the company must refund at the state's behest.

The action here comes on the heels of the Ohio Supreme Court's decision to order Cincinnati Bell to refund more than $20 million in overcharges that also stemmed from the application of the FCC's depreciation schedule ("Cincinnati Bell to refund $20m," *Network World*, June 16).

In rate hearings conducted in 1983, the Washington State Utilities and Transportation Commission (WUTC) disregarded FCC-mandated depreciation schedules and opted to enforce its own slower depreciation schedules. "We attempted to resist FCC preemption," said a WUTC spokesman, but a U.S. District Court granted an injunction to Pacific Northwest Bell allowing it to use the FCC's faster depreciation methods.

The WUTC appealed that ruling and told Pacific Northwest Bell it could be forced to rebate any revenue in excess of what would have been received under the WUTC depreciation schedule if the WUTC won on appeal. The WUTC has filed a petition to have the injunction overturned in light of the U.S. Supreme Court ruling and will decide whether to reopen the 1983 case if that petition is granted, a WUTC spokesman said.

Pacific Northwest Bell is asking the WUTC to retain the FCC depreciation schedules. The Washington State Public Counsel is expected to ask the WUTC to impose the slower depreciation schedules it was prepared to adopt in 1983 and to force the phone company to refund any excess revenue taken in from accelerated depreciation.

Pacific Northwest Bell claims revenue from increased depreciation allowances was reinvested in telephone network improvements and has said it will borrow money needed to fund any ordered rebate, rather than dipping into corporate funds or stockholder dividend accounts. That borrowing would force Pacific Northwest Bell to seek higher rates to cover loan repayments, which a spokeswoman for the BOC said could result in ratepayers ultimately paying $2 for every $1 rebated.

The spokeswoman said the revenue has been used to fund a $53-million modernization plan dubbed Project Avalanche, which calls for the installation of digital switches. The switches will provide rural users here with push-button dialing, three-way calling, call waiting and call forwarding features.

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ISDN from **page 2**

are," said Earl Vogt, telecommunications manager for U.S. National Bank, headquartered in Portland, Ore.

"I've been dealing with technology long enough to know it's a double-edged sword. Participating in the trial is exhilarating, but you can't let that emotion run away with you. It's a challenge to make sure there is some reality to the technology and to turn it into a tool for the bank."

U.S. National Bank is one of the participants in an ISDN trial being conducted by Pacific Northwest Bell. Like Mountain Bell, Pacific Northwest Bell is a US West company. The bank is converting to digital communications systems wherever possible, Vogt said. He is looking at ISDN as a way to integrate voice and data and to carry a digital pipeline all the way to the desktop.

"More and more in our business, we're creating positions that are both telephone and data intensive, such as telemarketing," Vogt said. "Such applications could be more efficiently implemented if they employed a single wire pair."

During its trial, Honeywell will use ISDN to provide dial-up data transmission at 9.6K bit/sec. This dial-up data transmission is currently handled by Centrex at 1.2K bit/sec. The computer vendor is also working with Mountain Bell to provide a number of Honeywell employees with ISDN capabilities in their homes. Some 10 employees will be able to work from terminals in their homes, and two houses are scheduled to be set up with alarm systems.

Honeywell also plans to use ISDN for telemetry, including control of temperature and lighting at the two company sites slated for the trial, Karau said. The technology will also be put to work in security applications, such as the reading of personnel badges and control of entrance gates at remote facilities.

The Arizona Department of Transportation, which also will be participating in the Phoenix trials, currently uses some 60 dedicated leased lines that offer data transmission rates between 2.4K bit/sec and 14.4K bit/sec.

According to John Amidon, deputy manager of operations, the department will use ISDN to combine voice and data traffic on the same lines and to support higher data transmission rates. Several applications are scheduled to be tested during the trial, with most communications being conducted between the building that houses the motor vehicle division and the computer center across the street, Amidon said.

The department uses two Amdahl Corp. mainframes as part of a real-time system for tracking motor vehicle registration, driver's licenses and other data. During the trial, ISDN technology will handle the communications for processing titles for vehicles, as well as inquiries on vehicles registered in the state.

"The more communications applications we support, the more important it is for us to find economical means of operating them," Amidon said.

Trial participants have had few reservations about their involvement in the pilot tests. Early on, Vogt questioned whether the timing of the trials was inappropriate in light of the immaturity of the technology. He wondered whether ISDN could offer any additional value over existing communications networks and was concerned about the time and corporate resources the bank might have to invest.

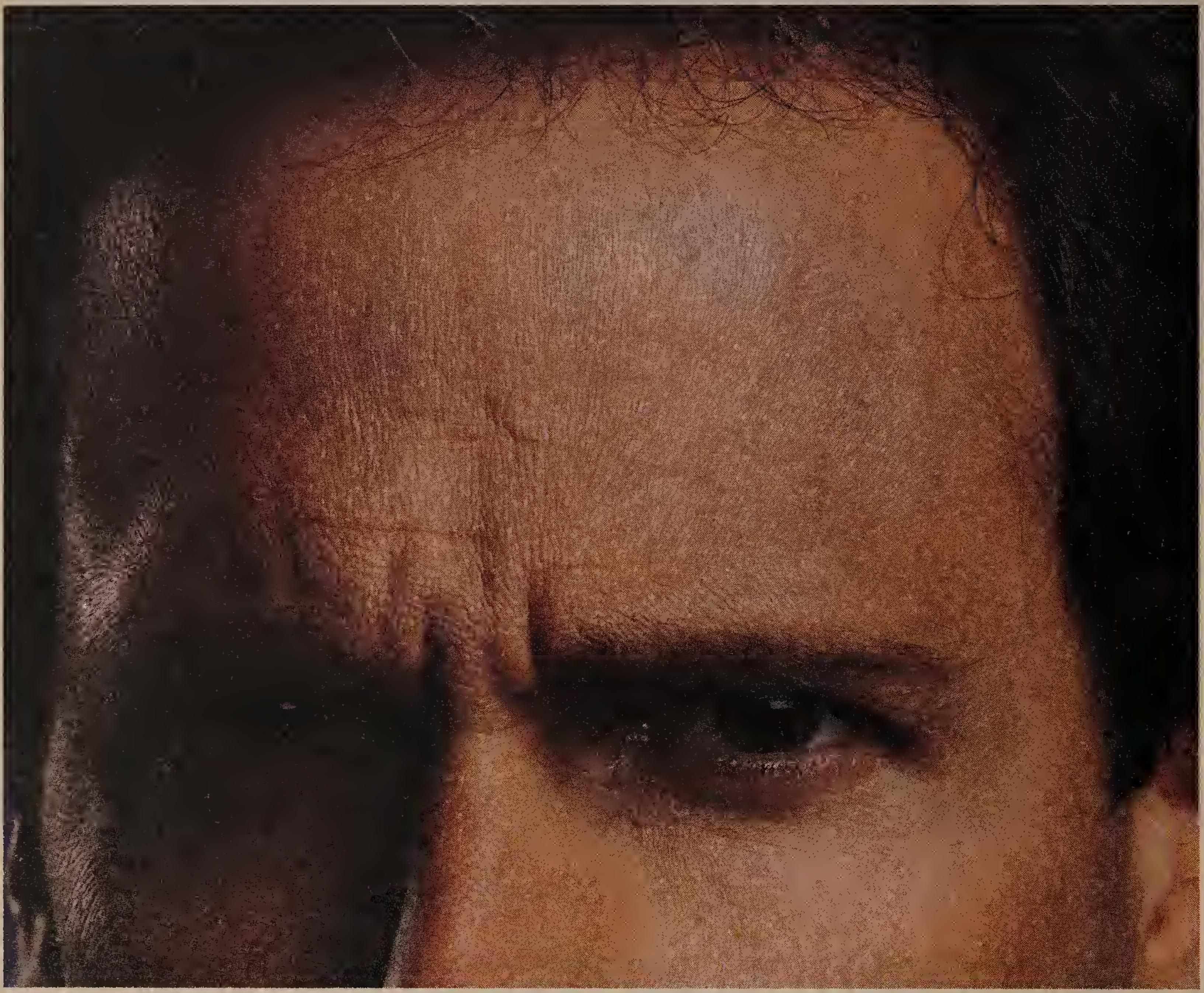
But Vogt's doubts have disappeared with the passage of time, he said. "The further we've gotten into it, the more I feel it is important for us and will be worth the investment."

Telegroup drops out

One scheduled participant was recently forced to drop out of the Phoenix trial. Telegroup, a division of Phoenix Newspapers, Inc. that operated a public access videotex system called Teleguide, was recently shut down for failing to meet its profitability goals. Telegroup had planned to put 20 of its more than 100 terminals on an ISDN system, according to Joe Cole, Telegroup's general manager.

Besides increases in speed and reliability of data transmission, Telegroup believed ISDN could help it break away from the specialized terminals it used. Currently, the company has terminals that use a telecommunications protocol called the North American Presentation Level Protocol Syntax (Naplps). With ISDN, it could potentially use generic devices such as personal computers and printers. Using such general purpose equipment, the videotex provider hoped it could broaden its customer base.

Like Amidon and Karau, Cole believes ISDN technology must be reasonably priced if it is to succeed. Cole said users are only willing to pay so much for added value. Karau added, "The whole thing hinges on how Mountain Bell is going to tariff it. Anyone offering ISDN is going to have to make it attractive; they're going to have to be competitive with Centrex rates." ◼



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INDUSTRY UPDATE

> “The [IBM] 3174 controller . . . can only come as a blow to the data communications hardware vendors that based their existence on selling ladders to users who wanted to cross the walls [between the worlds of Systems Network Architecture, Ascii and managed/optimized networks]. The victims of this major change in market structure will be the companies that have specialized in products or services whose existence depended on the walls being there.
>
> From International Resource Development, Inc.'s “Telecom Eye-Bee-Em” newsletter.

▶ LONG-DISTANCE SERVICE

US Sprint betting future on fiber facilities

New contender hopes fiber quality will win converts.

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — US Sprint Communications Co. began operations last week, exactly six months after partners GTE Corp. and United Telecommunications, Inc. announced plans to merge their long-distance and data communications operations into a new, more competitive entity. The company has embraced a three-pronged strategy that calls for rapid growth, the wresting of market share from competitors and speedy deployment of fiber-optic facilities.

The combined venture brings together 2.6 million customers, $2 billion in assets and aggressive network construction plans that call for the eventual deployment of some 23,000 miles of fiber-optic transmission facilities nationwide.

GTE and United Telecom concluded their merger June 30, one day after the U.S. Department of Justice sanctioned the deal. A week earlier, the Federal Communications Commission endorsed the marriage of the No. 3 and No. 5 long-distance companies, respectively, saying the move would create a stronger competitor in the market to contend with such dominant players as AT&T Communications, Inc. and MCI Communications Corp.

First digital, all fiber net?

In meeting with the press last week, US Sprint officials emphasized the company's intention to become eventually the first major long-distance player with an all digital, all fiber-optic network. Company officials outlined the benefits users will gain from fiber technology. Higher speeds for voice, data and video transmission, improved quality connections and transmission integrity coupled with price competitiveness will attract increasing numbers of residential and business customers, Charles Skibo said. Skibo shares the office of the president of US Sprint with J. David Hann, who is also head of GTE Telenet.

US Sprint will deploy more fiber-optic transmission capacity in the next year and a half than any other U.S. telecommunications firm, Skibo claimed. The fiber facilities will help the new firm improve its current combined 4% market share to 10% share over time, he added. To date, US Sprint has 5,500 miles of fiber in use.

GTE brings its residential voice market and international presence to the venture, while United Telecom contributes the edge it has gained in the business market with its sophisticated network and array of business services, Skibo said.

“Together, the two firms will have an attractive product array to serve all segments of the market. We have taken the best of both to bring to the marketplace,” Skibo said.

T-1 transmission, virtual private networks and videoconferencing, software-defined networks, international calling capabilities, Wats Plus, Virtual Banded Wats and Dial-1 Wats are some of the business services that will be offered.

See **GTE** page 10

▶ TRANSMISSION EQUIPMENT

Market for digital cross-connects predicted to skyrocket by 1990

Trend linked to rise in digital switches and fiber circuits.

RANDALLSTOWN, Md. — A recent study predicts the market for digital cross-connects will nearly triple in value by 1990, owing to the shift away from analog technology in the public network.

According to Trans-Formation, Inc., a research firm based here that studies transmission equipment markets, the market for digital cross-connect equipment will grow to nearly $425 million by 1990, up from $142 million in 1985.

Digital cross-connects are used to switch multiplexed channels within T-1 1.54M bit/sec digital facilities without demultiplexing the signal. A cross-connect configured as a hub for three T-1 links could, for example, route one of the 24 64K bit/sec channels within an incoming T-1 to any of the outgoing ports.

Digital cross-connects are replacing channel banks, which provided the same switching function when configured back-to-back. One channel bank would demultiplex the digital T-1 signal into 24 channels, which could then be patched to a port on the other channel bank and remultiplexed.

Trans-Formation reports the demand for digital cross-connects has increased in conjunction with the increased number of digital switches and higher speed fiber-optic transmission circuits in service. The firm says telephone companies are increasingly relying on digital cross-connects to support restoral, reconfiguration, automatic testing and customer control of such features as bandwidth.

Competitors to make inroads

While AT&T Network Systems has dominated the digital cross-connect market to date, Trans-Formation predicts competitors will begin to make significant inroads in 1987 as new-generation DS-3 systems are delivered in larger quantities. The study says competitors will attack AT&T with higher capacity systems, more up-to-date technology, lower prices and improved delivery schedules.

The study, entitled *Digital Cross-Connect Market*, is priced at $750 from Trans-Formation, Inc., 9337 Liberty Road, Randallstown, Md. 21133.

CONTRACTS

TORRANCE, Calif. — **TRW, Inc.'s Information Networks Division** has signed an agreement with **Col-Ins-Co.** of Orlando, Fla., through which Col-Ins-Co. will market the TRW Concept 2000 line of broadband and baseband local-area network products. The deal is the first such manufacturer's representative agreement covering the Southeastern U.S. that the Information Networks Division has consummated since it was formed a year ago. Col-Ins-Co. will sell the Concept 2000 products on an exclusive basis in Florida, Georgia, Alabama, Mississippi, Tennessee, Louisiana, North Carolina and South Carolina.

SAN FRANCISCO — At the recent North American Telecommunications Association conference here, **AT&T** said it will begin selling its coin-operated telephones to individuals and businesses nationwide. The announcement marks the first time AT&T has offered pay telephones to customers other than local telephone companies. The 50-pound steel and chrome electronic AT&T Private Pay Phone uses normal household current and will be marketed at prices ranging from $1,425 to $1,875 per unit through AT&T account executives and authorized distributors. Availability is planned for January 1987.

HAUPPAUGE, N.Y. — **Cincinnati Bell Telephone** has signed a letter of intent with **Databit, Inc.** here to purchase a packet-switched network system that will provide the phone company's customers with multiple-protocol data transport services between terminal equipment and host processors. A spokesman said the network will feature Databit Advanced Network Processors performing switching and network access functions and will support X.25, asynchronous, IBM 3270 Binary Synchronous Communications and Systems Network Architecture/Synchronous Data Link Control and X.75 protocols. Databit, a division of Siemens Communications Systems, Inc., said the network will be operational early next year.

PLACENTIA, Calif. — **Kanematsu Semiconductor Corp.**, a subsidiary of **Kanematsu-Gosho Ltd.**, has purchased a 10% interest in high-speed modem manufacturer **Telenetics Corp.**, based here. A spokesman said the Japanese firm will not be involved in the daily operations of Telenetics. The investment, he said, was based on the strength of the Japanese yen compared to the U.S. dollar.

▶ FUTURE SERVICES

Southwestern Bell sets September ISDN test

Pilots to feature Ericsson AXE switches.

ST. LOUIS, Mo. — Southwestern Bell Telephone Co. said recently it will begin, in September, a marketing trial of Integrated Services Digital Network services using Ericsson, Inc. switching equipment.

Tim Clark, a spokesman for Southwestern Bell, said an Ericsson AXE switch would be installed at each of two remote ISDN demonstration centers. The centers, in Dallas and Houston, will be linked to a host AXE switch at Ericsson's Richardson, Texas, headquarters. The switch housed at the Houston demonstration center is a portable unit that Southwestern Bell will relocate to what Clark described as "major markets in the company's territory" during the marketing trial.

"The demonstration centers will allow interested customers to get hands-on experience with the technology," Clark said.

According to Clark, high-speed telefax, simultaneous voice, data and video transmission, videotex and interfacing to local telephone networks will be among the ISDN features to be tested during the trial. The trial is scheduled to last for at least a year and will begin when equipment installation and training is completed, a process expected to take 10 to 12 weeks, he said.

The company said the Texas project is consistent with plans it revealed in March for a multiphase technical ISDN trial to be held here in conjunction with AT&T, Bell Communications Research, Inc. and Northern Telecom, Inc.▣

GTE from **page 9**

US Sprint will also give increased attention to customer service and support with seven newly created regional offices with staffers assigned to deal with individual customers.

"Our star account representatives will monitor the customer's lines daily and make monthly visits. Through this program, we hope to detect line problems before they become customer problems," said Edward Carter, senior vice-president of sales and marketing.

The company took advantage of last week's briefing to unveil an aggressive advertising campaign. That campaign will emphasize US Sprint's ability to provide higher quality service than is currently available, at prices below the competition, Carter said.

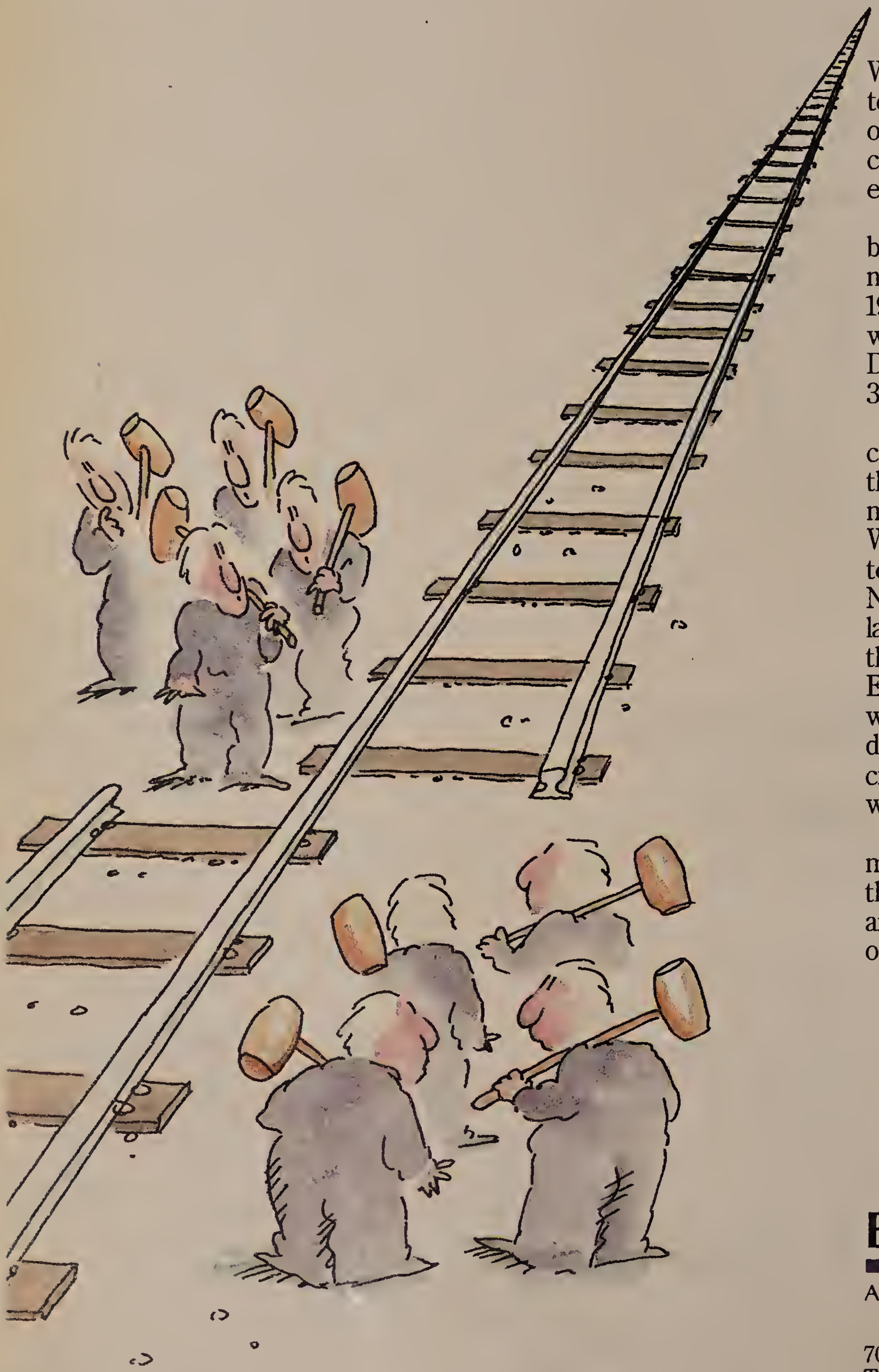
US Sprint expects to continue the expansion of its corporate and residential customer bases but hopes to maintain its current mix of 55% business customers and 45% residential customers. The company hopes to influence the buying patterns of corporate telecommunications users by emphasizing GTE Telenet's experience in the data communications business, Hann said. Data communications is seen as the fastest growing segment of the business telecommunications market.

> *"There has been speculation that the merger would bring about disruption to customers."*

The partner firms began merging their customers and physical plants last week. There has been speculation within the industry that the merger would bring about disruption to customers, especially in the data communications area. Hann noted that the companies have been planning for months to prevent such disruption. "We can't afford any disruption, and our customers certainly can't either," Hann said.

Building in redundancy

The partners have been building redundancy into the system, which will ease the way through the integration period. US Sprint will also send notices to customers informing them of the merger and any new procedures they must follow. Business customers will receive a call from their sales respesentative to ensure a smooth transition. The only difference a user may encounter is being issued a new telephone number with which to access the Telenet data network.▣



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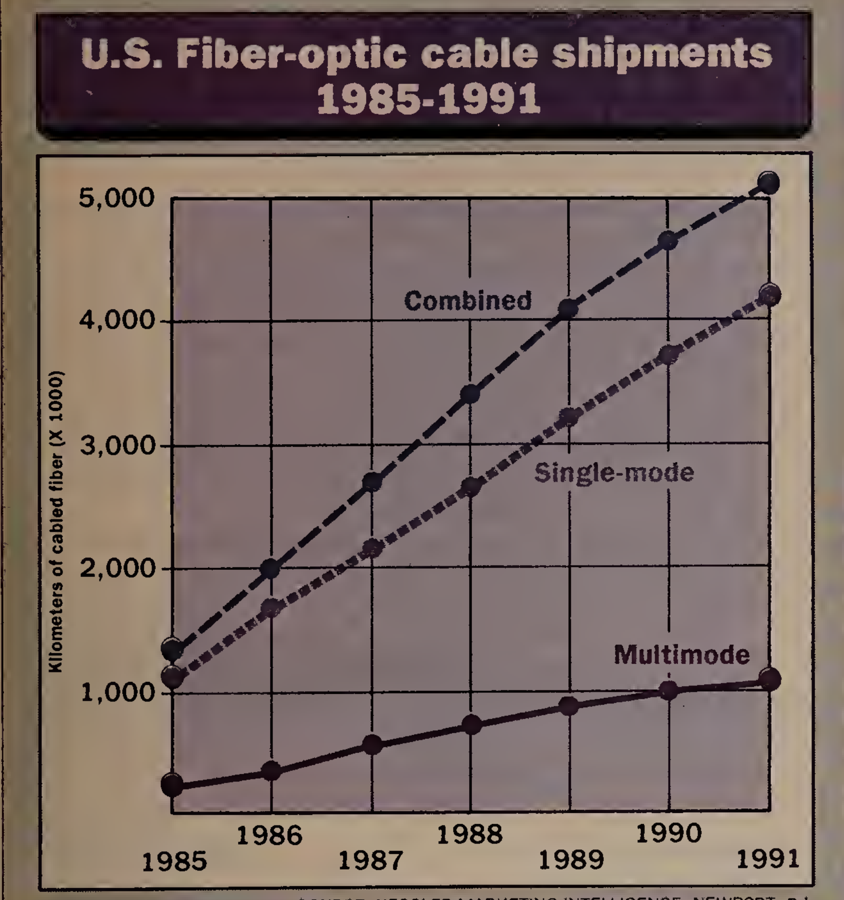
TELECOM TRENDS

AT&T's coin-op cure for phone fanaticism

AT&T may have found the solution to that teen-age disease dreaded by parents across the country — telephonitis. The company recently announced that it will make its coin-operated telephones available to customers, instead of just telephone companies. The $1,875 phones have antivandalism and antifraud features needed by parents of frantic phone fanatics. The pay-as-you-prattle telephones, which will be made available through distributors this September, may seriously curtail teenage phone abuse.

U.S. Fiber-optic cable shipments 1985-1991



SOURCE: KESSLER MARKETING INTELLIGENCE, NEWPORT, R.I.

▶ VSAT SERVICES

AT&T battles new Skynet challenges

Rivals want FCC to review accounting rules.

BY NADINE WANDZILAK
Staff Writer

WASHINGTON, D.C. — AT&T Communications, Inc. is expected to give its response to the Federal Communications Commission today regarding complaints filed by several other carriers requesting the FCC to review its decision to allow AT&T to offer Skynet Star Network Service, a very small aperture terminal satellite service.

MCI Telecommunications Corp. and Equatorial Communications Co. are the principal opponents of Skynet. MCI and Satellite Business Systems (SBS) are "calling for commission review of the Common Carrier Bureau decision allowing Skynet to operate," MCI spokesman John Houser said.

Equatorial supports the MCI/SBS appeal and levies three additional criticisms, according to its legal counsel, Phillip Spector of Goldberg & Spector in Washington, D.C.

Since AT&T filed a proposal with the FCC in March to offer a point-to-multipoint data and video communications satellite

See **MCI** page 12

CROSS TALK
JOHN DIX

IBM Token Ring links controllers and leaves terminals to Cabling System

With the announcement of its new terminal controller three weeks ago, IBM confirmed it will use its Token-Ring Network to link controllers to hosts, but will rely on its Cabling System to connect controllers to displays. This has implications for users considering cabling and local network options.

The 3174 Subsystem Control Unit, the long-awaited successor to the IBM 3274 controller, will offer a Token-Ring Network interface as one of its many connectivity options ("IBM's well-connected device," *Network World*, June 30).

Both remote models of the 3174 — which are linked to hosts through a front-end processor as opposed to being channel-attached directly to a host — can support Token-Ring adapters. The floor-standing 3174 3R can link 32 3270 terminals and 24 asynchronous Ascii devices to the ring network; the tabletop 53R can link 16 3270s and eight asynchronous devices.

The 3174 lives on the ring with other devices and is attached to remote hosts through the Token-Ring Network adapter for the 3725 and 3720 front-end processors.

From the controller, however, the 3174 employs point-to-point connections using coaxial cable, shielded twisted-pair wire or simple telephone-type twisted-pair wire.

This makes economical sense because a single network interface can link up to 56 devices to the network, as opposed to each device requiring its own network interface.

> *"Moving terminals is as simple as plugging the device into an outlet."*

Wiring devices to the controller in this hub-and-spoke topology is also simpler than it would at first appear because of the star configuration of IBM's Cabling System. A 3174 controller installed in a wiring closet can be attached to any office by simply picking up the wire pairs to that office. Moving terminals is as simple as plugging the device into an outlet in the new office and making a wire patch in the wire closet. No software change is required.

Users that don't have Cabling Systems can also take advantage of the new controller, because simple twisted-pair wire can support 3270s through use of the Model 3 of the 3299 terminal multiplexer. The 3299 attaches to the controller with coaxial cable or shielded twisted-pair and has RJ-11 phone jacks on the terminal side that can be tied to spare telephone wire running to each office.

The multiwire Cabling System can support Token-Ring connections to an office as well as point-to-point hardwire connections between a controller and a terminal.

Where installed, the Cabling System gives IBM a position of strength, but the 3299 and use of telephone-type twisted-pair enable any customer to take advantage of the 3174.

This flexibility bodes ill for local network manufacturers

See **Cabling System** page 12

▶ GTE TELENET

PC service expanded

Users can access PC Pursuit all day.

BY JIM BROWN
New Products Editor

RESTON, Va. — GTE Telenet Communications Corp. announced recently that personal computer users can access its PC Pursuit service 24 hours a day from any of 17,000 local telephone exchanges.

The PC Pursuit service had been limited to nighttime and weekend use for a flat fee of $25 per month. The around-the-clock service still has unlimited nighttime and weekend access for $25 per month, but daytime access ranges in price from $10.50 per hour to $14 per hour, depending on where the call originates.

PC Pursuit enables personal computer users to access long-distance, off-network data bases and other communicating microcomputers through a local call.

Users can obtain information from free public data bases at 300 bit/sec to 1,200 bit/sec, download and upload public domain software, research professional projects through free data bases and shop and advertise in electronic catalogs.

Access to PC Pursuit is through identifications and passwords that

See **GTE** page 12

GTE from **page 11**

can be changed or deleted by Telenet.

With the addition of Newark, N.J., and Seattle, PC Pursuit subscribers can now reach 14 cities with local calls.

In addition to these cities, the following metropolitan areas can be reached through PC Pursuit: Atlanta, Boston, Chicago, Dallas, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, San Francisco and Washington, D.C.

The PC Pursuit bulletin board will accept calls from interested subscribers 24 hours a day at (800) 835-3001.

A GTE Telenet sales representative can be reached toll free at (800) 368-4215. ☑

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▶ PACBELL

Alarm system uses voice lines

BY JIM BROWN
New Products Editor

SAN FRANCISCO — Pacific Bell, an operating company of Pacific Telesis Group, is the latest of the former Bell operating companies to test simultaneous voice/data transmission technologies to provide alarm monitoring services.

The Pacific Bell Poll Star Derived Local Channel Security Transport System uses technology called Versus 90, developed by the Trenton, N.J.-based Base 10 Systems, Inc.

Scanners are installed at telephone company central office switch locations, which use existing voice lines to poll remote alarm sensors approximately every 30 seconds. Polling is achieved by carving out a low-speed data channel at a frequency below voice, enabling a single copper pair wire to support both voice and data simultaneously. Complementary hardware at the subscriber's location is used to separate the data signal from the voice line.

If alarms are detected by the central office scanner, the device will forward the alarm status to a host computer, which establishes a link with security companies or private in-house security forces.

Poll Star can be used to transmit alarms upon the detection of fire, intrusion, smoke and flooding. The service may also make it possible to provide other monitoring services, such as gas meter reading.

Poll Star will be offered through a network of authorized dealers.

The service can be used to monitor up to 11 alarm sensors spread throughout a home or office. Each sensor is interfaced with an on-site subscriber Poll Star scanner installed by the security or alarm company. That on-site scanner connects to the telephone line through an RJ-11 jack.

Pacific Bell has authorized Poll Star dealers in San Francisco and parts of Los Angeles and plans to add other dealers in Los Angeles, Oakland and Hayward, Calif. Other Bell operating companies offering the service include Pacific Northwest Bell, Southern Bell Telephone and Telegraph Co. and South Central Telephone Co. ☑

Cabling System from **page 11**

that are selling terminal multiplexing as a justification for their coaxial cable-based, premiseswide networks. Vendors such as Ungermann-Bass, Inc. sell gang connectors that tie up to eight terminals to a network to communicate with a remote controller.

Besides costing more per connection — because each device needs a network interface — using local networks to carry the 2.4M bit/sec speed data between terminals and controllers may sap network capacity. A user of Wang Laboratories, Inc. broadband Wangnet local network, for example, had to install two networks to accommodate its 3270 and Wang workstation traffic.

It makes better sense, as IBM has found, to address the high-speed terminal-to-controller connection with simple point-to-point wires.

Although most of the traditional local network vendors have endorsed use of different cable media, IBM and AT&T have an advantage because they sell wiring solutions, not just network solutions. IBM's Cabling System and AT&T's Premises Distribution System can be installed to meet simple terminal support needs and later used to support local networks. ☑

Ohio Bell of Cleveland has been lugging a Siemens Communications Systems, Inc. EWSD central office switch around in a truck to demonstrate to customers the potential benefits of Integrated Services Digital Networks.

The demonstration features the 2B+D ISDN signal format that provides two digitized 64K bit/sec voice channels and one 16K bit/sec data channel over a single copper wire pair.

Ohio Bell sets up digital phones, facsimile machines and other data terminal equipment in hotel rooms and links the equipment to the truck outside.

John Humphries, district manager of network strategic planning for Ohio Bell, said customer reaction to the demonstration is helping the company gauge interest in ISDN and better plan for its introduction.

MCI from **page 11**

service, several companies, including MCI and Equatorial, have argued that AT&T planned to cross-subsidize its Vsat service with revenues from other services.

In response to competitors' concerns, the FCC ordered AT&T to account separately for revenue, costs, investments, net earnings and other financial information associated with AT&T's Vsat service.

MCI contends that the FCC's Common Carrier Bureau "abdicated its responsibility to regulate AT&T in the manner required by law. . .substituting a regulatory scheme that falls far short of the commission's obligation to regulate in the public interest."

The accounting provision leaves the FCC without a sound basis to determine whether AT&T has properly separated Skynet revenues and costs to judge the appropriateness of the service rates, MCI claims.

Furthermore, Skynet "poses a substantial risk to the viability of competitive vendors and, in the longer run, to consumers who will be deprived of the benefits provided by a competitive environment," MCI claims.

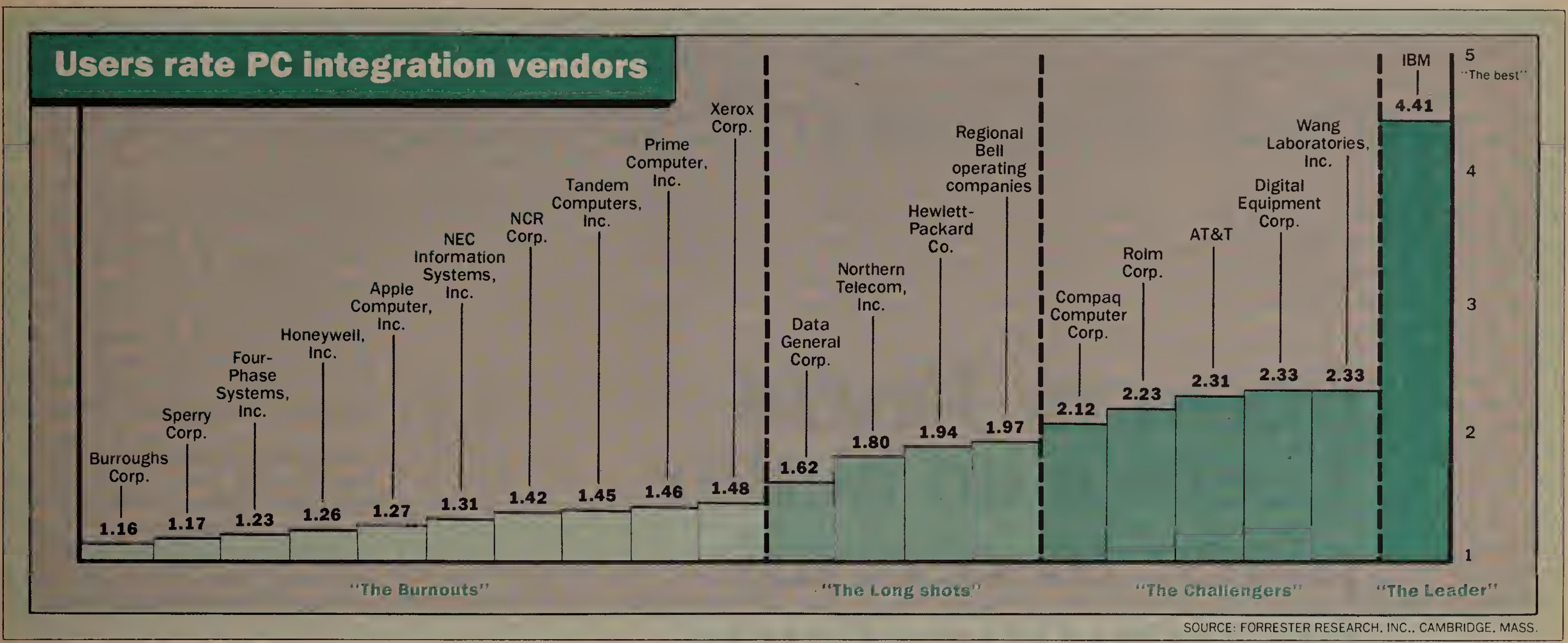
Equatorial contends that the FCC's order "fails to protect AT&T ratepayers from cross-subsidization; that the AT&T tariff is deliberately ambiguous and seriously misleading; and that AT&T misrepresented critical facts to the FCC about its transponder lease agreement with RCA American Communications, Inc." Nothing in the FCC's order prevents AT&T from shoring up its Ku-band service with revenue from other services, Spector said.

Equatorial has also filed a complaint against AT&T and RCA over their transponder lease agreement. Spector said AT&T's tariff documents fail to disclose that Skynet rates will double in 1989, that AT&T is committed to providing this service for only three years, and that the Skynet transponders are not protected, contrary to AT&T claims.

Equatorial requests that the FCC impose "appropriate sanctions for AT&T's violations of the commission's rules." ☑

DATA DELIVERY

> “It appears that Rolm [Corp.] products will do nothing more than switch asynchronous products on an IBM network. Before IBM purchased the company, Rolm officials had aggressive plans for linking their products to IBM networks. They have to be disappointed with the way things have turned out.
>
> **Greg Carlsted**
> senior industry analyst
> Dataquest, Inc.
> Cupertino, Calif.



SOURCE: FORRESTER RESEARCH, INC., CAMBRIDGE, MASS.

DATA DIALOGUE

PAUL KORZENIOWSKI

Weak link in IBM chain

Microcomputer-to-mainframe connections have represented a weak link in IBM's product chain. The rapid acceptance of the personal computer apparently caught the folks in Armonk, N.Y., napping. The company's initial link offerings were few and supplied only pieces of the connection that data processing managers desired. This situation resulted in an absence of a cohesive architecture for linking microcomputers to the company's larger bread-and-butter offerings.

A number of vendors stepped up to fill this void. Mainframe software suppliers, such as Cullinet Software, Inc. and McCormack & Dodge Corp., added links to their product lines. Initially, these types of links tied microcomputers only to the vendors' mainframe software packages.

Also, Digital Communications Associates, Inc. (DCA) aggressively tried to fill in the hole. The company's Irma board-level links represent the market's most successful line. DCA's approach was so widely accepted that other vendors were forced to add Irma compatibility to their wares.

Last month, IBM attempted to strengthen its weak link by announcing Enhanced Connectivity Facilities (ECF), an architecture for tying together microcomputers and mainframes. ECF consists of a series of microcomputer and mainframe components. The announcement was designed to close up a lot of the holes in IBM's product line, according to Marty Gruhn, vice-president of Sierra Group, a Tempe, Ariz.-based consulting firm.

The most noteworthy benefit of the architecture is a consistent user interface. Mary Patterson, director of cooperative processing at IBM's Entry Systems Division, noted that users often had been forced to work with a number of different types of interfaces to access the data they needed.

For example, a user worked with one package to extract data from IBM's IMS data base and a second to get data from a McCormack & Dodge general ledger package.

IBM is attempting to supply a consistent interface. On the surface, ECF works with virtually any type of data, so a user would have to work with only one set of commands. Lee Doyle, senior communications analyst at International Data Corp., a Framingham, Mass.-based market research firm, noted that IBM is trying to forge a more intelligent link than its competitors.

ECF also supplies security

See **Weak link** page 14

▶ PACKET-SWITCHED NETS

Papa Arpanet

Kahn watches research net grow up.

BY PAUL KORZENIOWSKI
Senior Writer

WASHINGTON, D.C. — Robert Kahn talks like a proud papa. As one of the chief designers of the U.S. Department of Defense's Advanced Research Projects Agency Network (Arpanet), Kahn has watched his baby grow from an idea to one of the world's premier research networks. But the evolution of Arpanet did not follow all of the designer's initial expectations; indeed, a number of changes to the network surprised even Kahn.

Originally, Arpanet was designed to facilitate communications among geographically dispersed institutions involved in government research work. Currently, only institutions with government contracts or universities conducting research projects are able to use the network.

Arpanet's first four nodes were connected in the fall of 1969. The network employed a new technology known as packet switching; in fact, Arpanet was the world's first packet-switched network.

Packet switching was chosen because designers thought the fledgling technology could best serve Arpanet's distributed data processing architecture. A number of universities were working on a variety of government projects, so a diverse array of computers, including then-emerging supercomputers, were used for information process-

See **Arpanet** page 14

IBM INSIGHTS

Ode to Ethernet. Included in the IBM product barrage was the company's first connection to Ethernet. The needed attachment, supplied by Ungermann-Bass, Inc., links IBM's RT Personal Computer to Ethernet. Chuck Kanupke, vice-president at Dataquest, Inc.'s New Jersey office, predicted that IBM will add Ethernet connections to some of its other offerings. Ethernet has emerged as a de facto standard. If IBM is to compete in that arena, it will have to supply additional Ethernet connections.

You can't get there from here. IBM sets some fairly lofty goals. The company has said it expects to reach $100 billion in revenue by 1990. A second goal is, brace yourself, $150 billion by 1995. To reach these projections, the company has to revamp much of its product line. A 370-page report, *Ten-year strategic analysis of IBM*, outlines probable changes in strategy. The report is available for $1,800 from Frost & Sullivan, Inc., in New York. Interested parties should call (212) 233-1080.

Arpanet from **page 13**

ing. Network designers thought research efforts would be enhanced if researchers could share computing resources. Although the term distributed DP is now widely recognized, in 1969, the concept was familiar only to academic circles.

Arpanet achieved its initial goal of linking a number of systems. Currently, more than 100 nodes are attached to the network, and many nodes act as gateways that connect as many as a few hundred additional devices to the network.

Despite the network's impressive growth, distributed DP did not evolve in the manner Kahn conceived. For example, Arpanet was initially designed to link only one computer at each site to the network. Shortly after the network was up and running, it became apparent that users wanted to link more than one computer directly to the network.

Also, the challenge of designing an integrated, multivendor network proved extremely difficult. One initial objective was to create a network flexible enough that programs from one machine could be easily executed on a second system. "The problem of resource sharing turned out to be much more difficult conceptually than anyone ever expected it to be," Kahn said.

One Arpanet feature initially overlooked, electronic mail, turned out to be one of its most widely used services. "The notion of using the network for electronic mail did not surface until the network was actually installed," Kahn said.

Another unforeseen development was the formation of a second network. In 1983, Arpanet was split into two networks, Arpanet and Milinet. Arpanet continued to serve as the government's principal research network. Milinet is used primarily by the Department of Defense. A number of universities and academic institutions work with both networks, and there are gateways between the two.

Arpanet has experienced a few problems. Hackers have broken into the network on several occasions and, in one of the more celebrated cases, accessed computer facilities at the Los Alamos National Laboratory. Kahn claimed that Arpanet's design included elaborate security features. When these features were properly implemented, hackers would not be able to access the network. Typically, oversights by system operators left hackers with an open door into the network, according to Kahn.

Arpanet spawned a number of other packet-switching networks. Bolt Beranek and Newman, Inc. oversaw Arpanet's installation and still maintains the network. The company was so impressed with packet-switching technology that it formed a subsidiary, BBN Communications Corp., that offers packet-switching devices.

Since his days as Arpanet's designer, Kahn has formed his own consulting firm, the Corporation for National Research Intiative. Much of Kahn's consulting work currently involves recommending enhancements to Arpanet. Kahn's child has successfully reached adulthood. ◼

Weak link from **page 13**

features that MIS managers have wanted since microcomputers first burst onto the scene.

ECF can be integrated with various mainframe security offerings, such as IBM's Resource Access Control Facility.

One reason IBM is pushing ECF is that the product is mainframe-based. Data translation and formatting is completed on a mainframe, which will chew up valuable processing cycles. If the package is widely adopted by a corporation, additional mainframe processing power may be needed.

Lengthy shipment delay

ECF presents a number of shortcomings, the principal one being a lengthy shipment delay. The scheduled availability of many key components has been set for the third quarter of 1987.

Once ECF products become available, existing applications will have to be tailored to support the new offerings. That process may further delay actual link implementations, and three to four years may be needed before IBM has its pieces in place.

Most companies have already implemented some type of microcomputer-to-mainframe connection. Those few companies that have yet to implement links may be unwilling to wait for IBM to implement its approach.

Software has not traditionally been one of IBM's strong points. Typically, third-party offerings have been better designed than many IBM wares. So, users may be disappointed with ECF.

The IBM architecture requires a number of pieces, such as personal computer software, mainframe software and terminal emulation software. When one adds up all the pieces, ECF could turn out to be a very expensive proposition.

On the surface, IBM appears to have strengthened a weak point in its product line. However, it is unclear if the IBM offering is strong enough to test the mettle of current successful link vendors. ◼

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>
> **James Burns**
> director of manufacturing practice
> Arthur Andersen & Company
> management information consulting division
> Chicago

▶ ANALYSIS

Users benefit from CIM demo

Thirteen-vendor exhibit provides a valuable view of state-of-the-market integrated manufacturing systems.

BY BOB WALLACE
Senior Writer

It may be many years before users who toured the Impact minifactory actually implement fully integrated manufacturing systems such as the one showcased at that demonstration. Nonetheless, users said the time spent at the Impact demonstration, held at the recent Advanced Manufacturing Systems (AMS) '86 show in Chicago, was well spent (“CIM steals show, but users still wary,” *Network World*, June 30).

The 13-vendor, 11,000-square-foot computer-integrated manufacturing (CIM) exhibit was probably of more value to users than the 21-vendor Manufacturing Automation Protocol/Technical and Office Protocol demonstration at the Autofact '85 exposition in Detroit last November.

The massive Autofact exhibit demonstrated the ability to connect equipment from many vendors over a MAP-compatible token-passing bus network. The most significant difference between the two factory communications/automation exhibitions was that the bulk of the systems used in the Autofact demonstration was prototype equipment and therefore was — and in many cases still is — not commercially available.

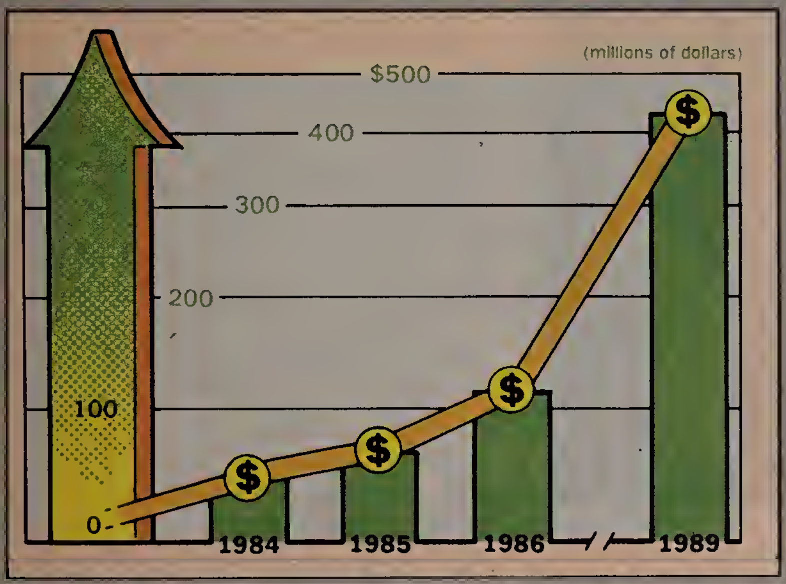
Conversely, the Impact demonstration featured an assortment of currently available factory communications and automation gear. Those users that have earmarked money for such equipment could order today any of the equipment spotlighted in Impact.

While the Autofact '85 demonstration offered manufacturers a glimpse into the future, the Impact minifactory showed users that currently available equipment can create an integrated manufacturing system today. The Impact demonstration was of inestimable value because it went a long way toward eliminating the widely held belief that the concept of CIM is no more than simply an acronym thrown around by industry analysts, network equipment vendors and factory networking seminar lecturers.

Rick Stuckey, a consultant with Arthur Andersen & Company, handled much of the Impact network planning and implementation. He

See **CIM** page 16

Factory local-area network growth



SOURCE: FROST & SULLIVAN, INC., NEW YORK

INCIDENTALS

General Electric and Fanuc Ltd., a Japanese corporation, signed a $200 million joint marketing agreement to produce and market factory automation systems and equipment. The new company created as the result of the agreement — dubbed GE Fanuc Automation Corp. — will be equally owned by GE and Fanuc. The new organization will be headquartered in Charlottesville, Va.

* * *

The Society of Manufacturing Engineers (SME) is offering a hands-on course on the topic of Computer-Automated Process Planning (Capp), Aug. 13 to 15 at SME World Headquarters in Dearborn, Mich. According to SME, potential users of automated process planning systems will learn about Capp in a real-life, problem-solving environment. The course emphasizes the hands-on solution of case problems involving design retrieval of complex assemblies. For more information, contact SME at (313) 271-0039.

FACTORY FACTS

BOB WALLACE

Consultant/accountant union to hasten factory integration

At least five of the Big Eight accounting firms now offer consulting services prepared for consumption by upper management of the nation's manufacturing corporations.

Arthur Andersen & Company, Arthur Young & Company, Coopers & Lybrand, Price Waterhouse & Company and Peat, Marwick, Mitchell & Co. have all shifted part of their focus from accounting to manufacturing consulting. The entrance of these firms into the manufacturing management consulting business should be a boon to companies whose livelihood depends on the efficiency of their factories. Users will now be able to enlist the aid of these accounting/consulting firms to help explain the need for factory modernization to the corporate executive boards and the chief executive officers — the people who give the thumbs-up to such expensive and long-term projects.

Consultants with Big Eight accounting backgrounds may also be able to explain to upper management — in dollars and sense — how important a certain factory project is to the corporation. Corporate engineers and directors of manufacturing often understand the technical aspects of these projects very well, but they encounter difficulty translating proposed projects into easily understood financial terms.

The five members of this new factory fraternity have dramatically increased their visibility in the manufacturing industry. Arthur Anderson has been the most visible of the group, recently acting as the systems integrator and coordinator of the 13-vendor Impact minifactory at the Advanced Manufacturing Systems (AMS) '86 show in Chicago (see story above). The firm paraded several hundred of its clients and prospective clients through the 20,000-square-foot demonstration. The company's Manufacturing Resource Planning software played a key role in the Impact demonstration. Peat, Marwick, Mitchell & Co. has already launched the *Manufacturing Industry Newsletter*. Price Waterhouse began distributing an in-depth manufacturing systems survey to its clients and other factory network users in an attempt to understand the demographics and concerns of these individuals.

> *“This new factory fraternity has increased its visibility.”*

Coopers & Lybrand distributed information regarding its management

See **Big Eight** page 16

CIM from **page 15**

claimed the minifactory was assembled to show manufacturers how different factory systems could be efficiently integrated.

"So many of the methods U.S. manufacturers have relied on for so long are wrong," he claimed. The key advantage of operating an integrated manufacturing system is that it allows manufacturers to reduce their product inventory drastically, he said.

"Impact used state-of-the-market equipment to help executives from manufacturing corporations cut through the CIM concept to get to the CIM reality," Stuckey explained.

Users have been shown how the correct blend of available factory equipment and manufacturing consulting expertise can be used to integrate a variety of functions on the factory floor.

Arthur Andersen, one of the Big Eight accounting firms that boasts a corps of manufacturing management consultants, acted as systems integrator of the Impact demonstration. The consulting firm stressed the need for manufacturers to adopt a three-step approach — dubbed the "simplify, automate, integrate process" — to solve their factory floor problems.

> *"Impact used state-of-the-market equipment to help executives from manufacturing corporations cut through the CIM concept to get to the CIM reality."*

The process calls for users first to simplify, or isolate, manufacturing processes. Users then must attempt to automate those processes. The final step calls for the integration of these shop floor systems.

Users interviewed at the AMS '86 show claimed Steps 2 and 3 present a number of problems. Users said they planned to automate selected processes but did not plan to automate all functions within their factories. The users said they would not be able to begin integration of those isolated factory systems for many years.

Much of the problem users face after attending an event such as Impact is communicating what they viewed and learned to those with the clout to approve projects designed to improve the efficiency of their manufacturing facilities. In many cases, the top management of manufacturing corporations is familiar with trends in factory networking technology but has trouble determining how the corporation can benefit financially or competitively by automation.

Users also struggle to view demonstrations like Impact in the appropriate context. Literature distributed at the AMS '86 show claims that automating and integrating manufacturing functions will enable manufacturers to realize huge financial savings. Arthur Andersen also says such systems integration will allow manufacturers to minimize the amount of time that elapses between the receipt of a product order and the manufacture of the specific product.

While those benefits may be the ultimate outcome of manufacturing systems integration, users should also be aware that a great deal of money and effort must be invested in any CIM project.

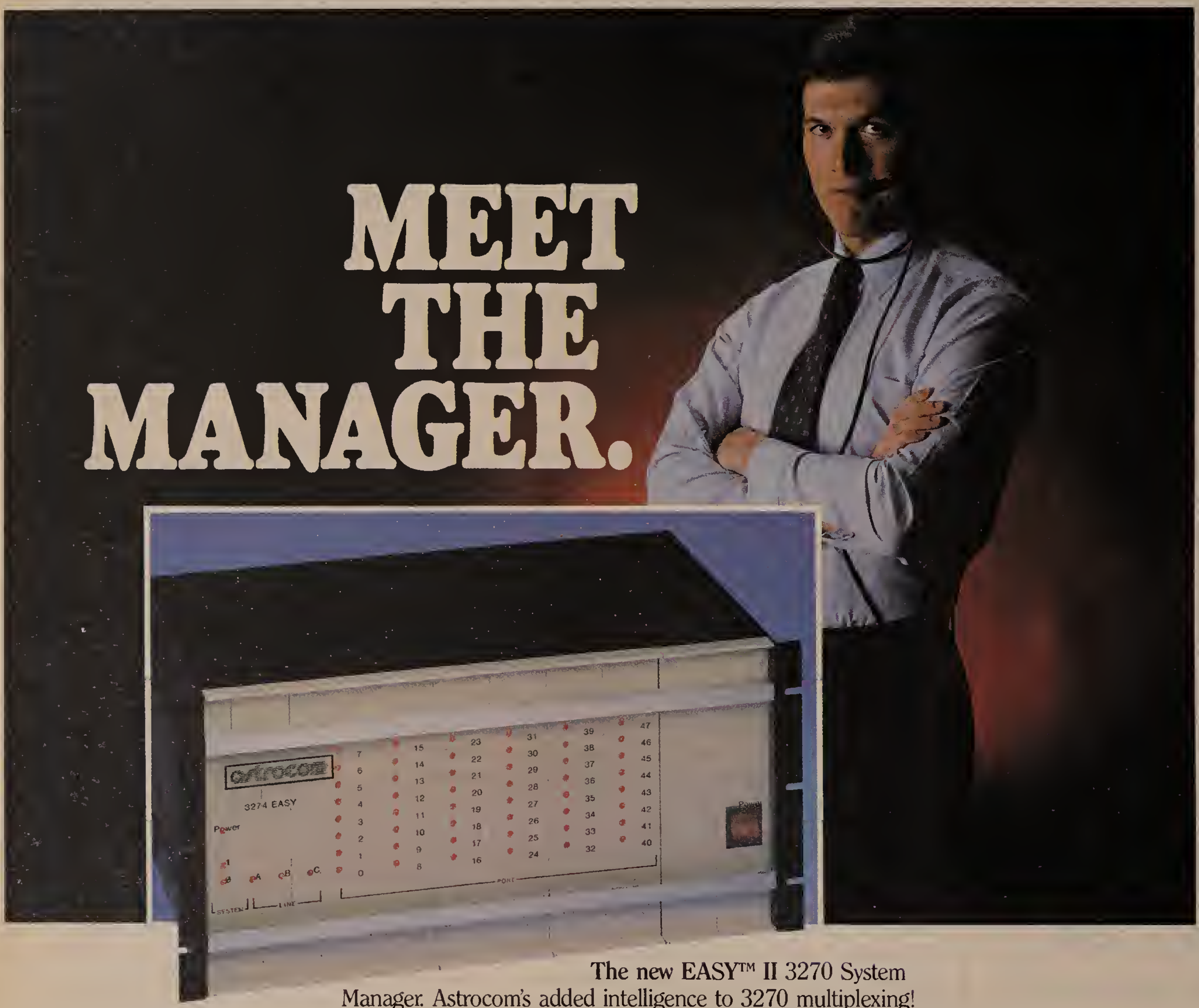
An unmatched demonstration

To its credit, Arthur Andersen and the 12 equipment vendors that donated the several million dollars of hardware and software used in the demonstration designed an as-yet-unmatched CIM demonstration. Arthur Andersen's Stuckey said the possibility of reconstructing the Impact demonstration in a permanent Chicago facility open to factory net users is being seriously considered. Vendors whose equipment was not used in Impact would be able to connect their equipment to the integrated manufacturing minisystem at this facility. ◻

Big Eight from **page 15**

consulting firm's manufacturing consulting services at the AMS '86 show. Arthur Young recently announced an agreement with Tandem Computers, Inc. that may allow the parties involved to comarket each company's manufacturing services ("Tandem, Arthur Young team up," *Network World*, June 9).

The entrance of these firms into the manufacturing consulting world may help factory network users upgrade their factories of the past to at least the level of factories of the present. ◻



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COMMUNICATIONS MANAGER

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>
> **Richard Van Slyke**
> director
> Center for Advanced Technology
> Polytechnic University
> New York

▶TRAINING TOPICS

The education of a manager

“Employers recognize the staff needs management and technical skills.”

In June, after two years of combined evening and weekend classes, 23 graduates were presented master's degrees in Telecommunications Management from New York's Polytechnic University.

The graduates are the first fruit of the school's unique employer-sponsored program, which is targeted at already-employed communications professionals seeking executive-level technical or management training. Students were drawn from such user organizations as Chase Manhattan Bank, Nabisco Brands, Inc., Time, Inc. and RCA Corp. The program's advisory board is made up of communications managers from user companies and top executives from the vendor community.

Richard Van Slyke, director of Polytechnic University's Center for Advanced Technology in Telecommunications, recently spoke with Network World *Senior Writer Margie Semilof on the state of communications education and employment prospects for new graduates.*

Real world communications concerns change from day to day. How can educators keep up and avoid the risk of teaching obsolete material?
It's difficult, so we recommend that students continue their education even after they finish the program. The mission of any technical institution is to provide grounding on fundamental principles, because those do not change.

Most of the emphasis in our course work is on technology because Polytechnic University has a strong engineering department. Most people get an intense education through on-the-job experience. However, there may be some piece of information or problem-solving situation that doesn't turn up at work very often. When the issue does come up, the tools to solve the problem may be drawn from [educational] background experience.

How is communications education changing?
It is beginning to exist. Everyone used to be trained by AT&T.

How much communications expertise does your average first-year student have?
We have two types of students. Some have the technical background and are trying to improve their management skills. Others are managers who want to improve their technical knowledge.

Our students are employer-sponsored. Those employers are able to recognize that their communications staff needs both management and technical skills. The concept of a generic manager who is able to manage anything is no longer sufficient.

Are you seeing more students entering master's programs from bachelor's programs in business or engineering?
We were surprised. We expected more students from technical backgrounds. But we have an equal number of students from management fields. In some cases, they have no experience in either telecommunications or management.

There are students from the user community who received training in a variety of places — some of [their on-the-job training] had nothing to do with their educational background.

Students are attracted to the program simply because of the growing importance of information sciences in modern businesses. We see that especially in the New York City area because of the immense financial services industry located here. Every new product announcement seems to have telecommunications aspects. Companies are beginning to realize that telecommunications provides a way to make profits and increase productivity.

How much do you expect the average graduate to earn?
When I was working in the private sector five years ago, people were earning six-figure salaries. A successful graduate of a telecommunications program who has been in the business for six or seven years can expect to earn that salary level.

The role of the communications manager has been heightened by divestiture. Do you think it is possible for a communications manager to become a chief executive officer?
An intermediate step has to be the creation of a chief information officer, with responsibility for MIS, data processing and customer service functions rolled into one. I can see someone moving up to CEO from that position.

GUIDELINES
ERIC SCHMALL

Wanted: solidarity in communications

Members of the communications profession are developing a sense of community. This process is necessary for the profession to mature fully.

Doctors have the American Medical Association, lawyers have the American Bar Association and teachers have the National Education Association. All of these organizations embody the spirit of fellowship in the pursuit of a common mission. While no such similar group exists for the communications profession, a number of developments are contributing to the healthy evolution of this communal spirit. Among the most significant are the growth in professional literature and the proliferation of national and local meetings, shows and conventions for users.

Professional trade journals, magazines and newspapers covering all aspects of the industry have grown in number, size and depth of coverage. The success of this literature is not attributable merely to heightened interest in the technology. Interest will continue to concentrate on literature that allows communications professionals to describe their experiences, struggles, opinions and solutions to the complexities of this technology. The successful literature in this industry provides a forum for managers to see what their counterparts are doing and saying.

This fosters a sense of identity and recognition of common concerns. For instance, isn't it heartening to know that other managers are equally confused about Integrated Services Digital Networks or equally uncertain about the course of divestiture? It's similarly comforting to recognize solutions that others have implemented as being identical to some you've recommended. If nothing else, such journalism dispels the bleak notion that no one else faces the same problems or complexities of this field.

A whole new dimension comes into play whenever communications professionals gather at formal convocations. National and regional communications conventions distinguish themselves by their sheer size and diversity. Watching the registrants mill about in these massive equipment bazaars gives one a rough sense of the dynamic growth in the industry. Listening to the exchange of ideas in the numerous, crowded conference halls adds to this sense of common needs shared by the attendees.

Users group meetings enhance the concept of professional camaraderie from a different perspective. The focus of the conference is narrower than a national show. Nonetheless, it allows the discussions between the users and the provider to identify specific needs and translate these into product and service changes.

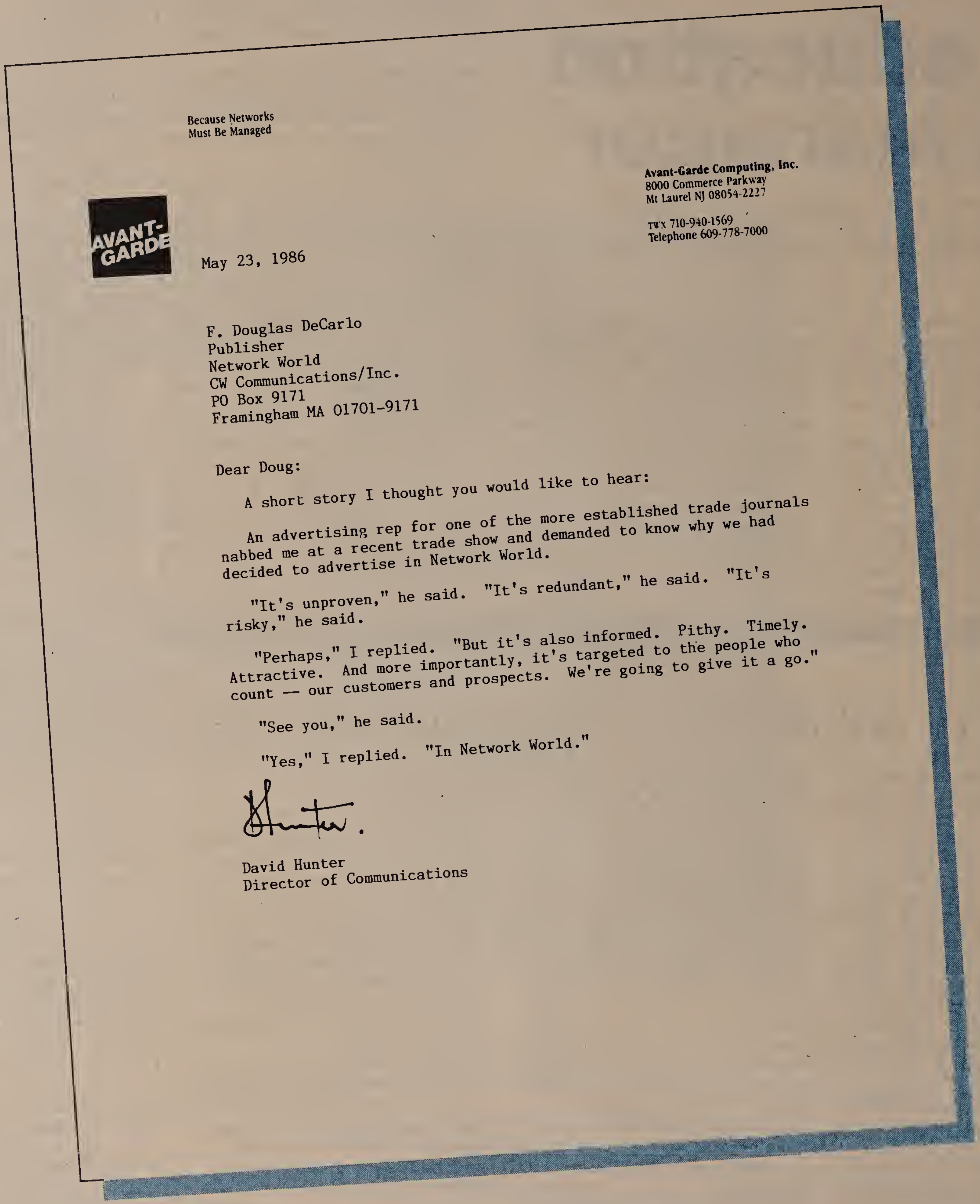
Local association meetings are like town meetings because they are held frequently, are more parochial and provide the members with a grass roots spirit of community. While national shows may satisfy some broad identity needs, local association gatherings allow for relevant professional interaction that addresses specific local needs. Local conditions may restrict options, solutions, vendors or available technologies. It's good to be able to confront those issues with others who face the same circumstances.

The manager's role in all of this is clear: participate. Read the literature, attend national meetings, join a users group or go to local meetings. Such activity will certainly enhance one's own operation.

Schmall is network systems manager for an insurance holding company.

Network World.
". . . it's targeted to the people who count — our customers and prospects."

David Hunter, Director of Communications, Avant-Garde Computing, Inc.



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TWX 710-940-1569
Telephone 609-778-7000

May 23, 1986

F. Douglas DeCarlo
Publisher
Network World
CW Communications/Inc.
PO Box 9171
Framingham MA 01701-9171

Dear Doug:

A short story I thought you would like to hear:

An advertising rep for one of the more established trade journals nabbed me at a recent trade show and demanded to know why we had decided to advertise in Network World.

"It's unproven," he said. "It's redundant," he said. "It's risky," he said.

"Perhaps," I replied. "But it's also informed. Pithy. Timely. Attractive. And more importantly, it's targeted to the people who count -- our customers and prospects. We're going to give it a go."

"See you," he said.

"Yes," I replied. "In Network World."

Hunter.

David Hunter
Director of Communications

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NETWORK WORLD

The Weekly for Leading Users of Communications Products & Services

A PUBLICATION OF CW COMMUNICATIONS

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NEW PRODUCTS AND SERVICES

In upcoming issues:
▶Gandalf Line Miser product review, July 14
▶T-1 mux product focus, July 21

▶ COMMUNICATIONS SOFTWARE

DEX unveiled

Series/1 data extraction tool lets users access files on diverse systems.

BY JIM BROWN
New Products Editor

SAN FRANCISCO — Software supporting data file transfers between a mix of computer systems was released by Computer Integrated Management, Inc., based here. The Data Exchange (DEX) package resides in an IBM Series/1 minicomputer as either a stand-alone data transfer system or a module in Computer Integrated Management's overall Manufacturing Control System software.

DEX acts as a data extraction tool that seeks out data located in data bases residing on various computer systems or from data collection terminals connected to computer-driven factory floor devices, and integrates it into virtual files accessible from any connected computer.

To do this, DEX creates a global data file dictionary that pinpoints where each physical data file is located and what protocol conversions will be needed to get to it.

The package stores a file access, read-only program on each connected system. Data bases are opened when that read-only program is activated through a high level command from DEX. "That provides the feeding mechanism for Data Exchange," said Leonard Bertain, Computer Integrated Management's sales and marketing vice-president. DEX seeks out the desired records or fields from that opened data base and brings them back to the Series/1, where they are reformatted and passed on to the computer system that originated the request.

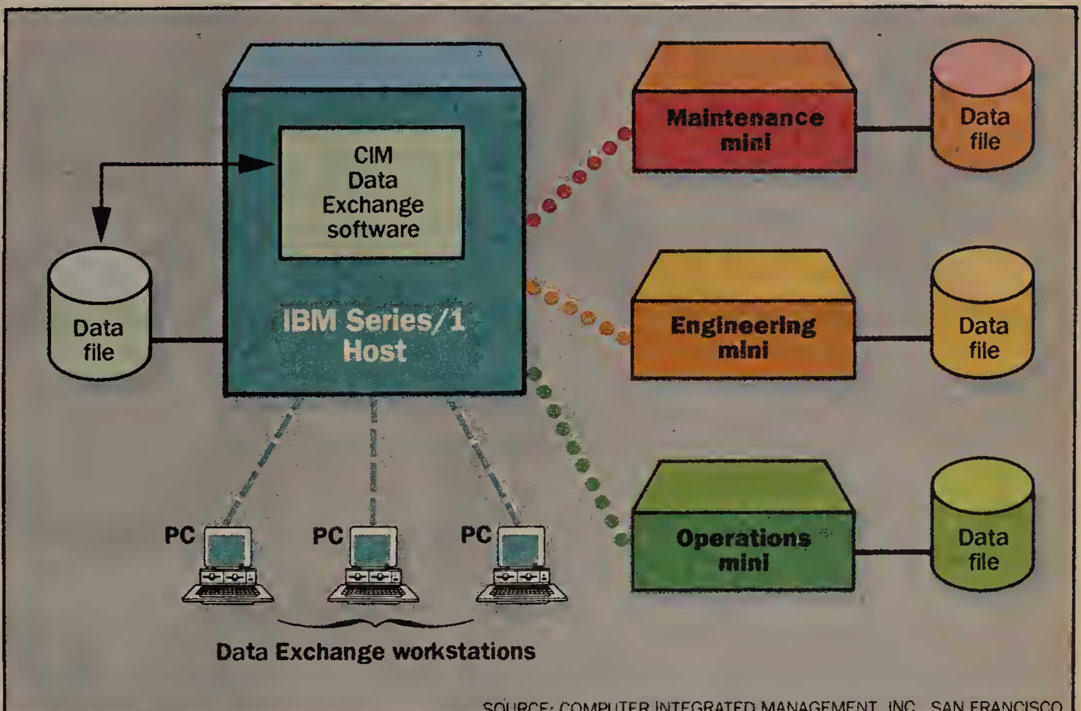
Users create virtual file structures within DEX, which runs as an application under IBM's Event Driven Executive operating system. Those virtual file structures inform DEX of the location of each bit of data needed to make a report. In preparing a virtual file structure, users enter commands through a DEX user interface on the screen of their attached terminal or personal computer and can request pieces of data residing on several different systems.

DEX has been designed to interface to other IBM, Digital Equipment Corp., Burroughs Corp., Data General Corp., Honeywell Information Systems, Inc., NCR Corp. and Sperry Corp. mainframes and minicomputers directly connected to the Series/1 or connected over any of a number of different networks. Protocol conversion allowing the mix of systems to talk is done within DEX. "The user views of the network are really transparent," Bertain said.

The package currently supports communications over the Manufacturing Automation Protocol, Systems Network Architecture, RS-422 direct connections, Ethernet and X.25 networks. It also currently supports Synchronous Data Link Control, Binary Synchronous Communications, asynchronous and High-Level Data Link Control communications protocols.

A DEX package supporting two communications protocols and system interfaces along with an IBM 40M-byte disk, printer, two Series/1 supported terminals and magnetic tape drive will cost between $100,000 and $150,000. An entry-level Manufacturing Control System including production scheduler, shop floor data collection and production control software modules ranges from $250,000 to $500,000.

Data Exchange environment



SOURCE: COMPUTER INTEGRATED MANAGEMENT, INC., SAN FRANCISCO

PRODUCTS & SERVICES

IBM 3178-compatible terminal

Lee Data Corp. has introduced an IBM 3178-compatible terminal.

The company's **Model 1178 display** is plug-compatible with IBM's 3178 terminal and reportedly operates with all IBM communications controllers. The terminal can be used for interactive inquiry, data retrieval, record modifications and program development tasks.

The device has a 14-inch screen that is two inches larger than the IBM offering. The product features a tilt-and-swivel monitor, four different style keyboards and optional amber lettering.

The Model 1178 is priced at $995.

Lee Data Corp., 7075 Flying Cloud Drive, Minneapolis, Minn. 55344 (612) 828-0300.

Modem power unit

A modem power unit designed to turn on the power of a personal computer when detecting incoming calls and shut it off when communications cease has been introduced by **Imagineering, Inc.**

The **Modem Power unit** is compatible with IBM Personal Computers, Apple IIc, Apple IIe and Apple MacIntosh personal computers. It senses incoming telephone calls, turns on the power supply to the receiving computer and allows communications to proceed.

The unit works with 17 command-driven software packages, including Dynamic Microprocessor Associates' Ascom IV, Microstuf, Inc.'s Crosstalk XVI and VM Personal Computing, Inc.'s Relay VM. The unit is compatible with internal and external modems supporting 300 baud to 1,200 baud, and it is compatible with Hayes Microcomputer Products, Inc. or Bell 103 and 212A models. Once activated, Modem Power retrieves files or runs programs under which a remotely located workstation will operate. When the session concludes, Modem Power waits a preset amount of time before shutting off the workstation.

Modem Power costs $280.

Imagineering, Inc., Box 601, Melville, N.Y. 11747 (516) 549-4558.

PC AT compatible file server

Quadram Corp. announced an IBM Personal Computer AT-compatible file server and two network operating systems for its Quadnet VI and XI local-area networks.

The **Ashernet Server** is based on an IBM Personal Computer AT and is equipped with Novell Corp.'s Netware local-area network operating system software. The server features eight expansion slots, two serial ports, two parallel ports, a monochrome monitor, a keyboard and a built-in 360K-byte floppy disk. The server supports up to four half-height hard disks capable of storing 732M bytes of random-access memory (RAM). A 60M-byte tape backup unit is also available.

The product is equipped with an 800-watt uninterruptible power supply and a system key lock that protects against tampering and unauthorized use.

Prices for the server range from $15,495 to $21,995.

Quadram also announced the addition of **Novell Advanced Netware 2.0/86** and **2.0/286,** which allow two or more Quadnets to be linked. The product bridge feature enables any file server with the new operating system software to support up to four concurrent networks.

NetWare 2.0/86 supports up to 50 users per file server and more than 250M bytes of storage. The 2.0/286 version supports up to 100 users per file server, 15M bytes of on-line RAM and up to 2G bytes of storage.

The price for a Quadnet VI Master Kit 2.0/86 is $1,995; a Quadnet VI Master Kit 2.0/286, $2,620; a Quadnet IX Master Kit 2.0/86, $3,395; and a Quadnet IX Master Kit 2.0/286, $4,345.

Quadram, One Mecca Way, Norcross, Ga. 30093-2918 (404) 923-6666.

Digital has it now.

A single company-wide communications system that lets you plug into voice, data and video as simply as this.

Introducing the DECconnect™ Communications System – the cost-effective way to give users every networking option they need, with snap-in ease. In a single wallplate, DECconnect gives you: a high-speed LAN connection using ThinWire Ethernet; a connection for terminals; a connection for telephones; and a connection for cable TV.

Now communications by voice, data and images can be integrated simply and cost-effectively at every user's workplace. With ThinWire Ethernet handling the high-speed data link, standard Ethernet LAN performance and functionality can be delivered at a greatly reduced cost per user. And ThinWire Ethernet's ability to communicate with other vendors' equipment ensures current and future compatibility. From planning to implementation, from installation to service, DECconnect adds up to the most flexible and simple-to-use communications system available today.

To find out how the DECconnect system can give you a competitive edge now, write: Digital Equipment Corporation, 200 Baker Avenue, West Concord, Massachusetts 01742. Or call your local sales office.

digital™

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Opinions

SECURITY

MICHAEL BEADSMOORE

A recipe for disaster

Take your garden-variety terrorist. Add a tempting, unprotected corporate target that contains one of the organization's most vital strategic assets — information. Knocking out this target could lead to major disruptions of service or even corporate bankruptcy.

That is the recipe for disaster. It's time to shake off the complacency that still exists at corporate and governmental computer data centers and network control centers in the U.S. It's time to protect the soft underbelly of the information age. Indeed, with the shadow of Libya's Muammar Qaddafi and vivid memories of the Mexico City, Mexico, earthquake, corporate communications and data processing managers would do well to consider just how vulnerable the strategically vital information in their charge actually is.

How many company officials can say with any confidence that the records, transactions, network directories, investment portfolios and other corporate information necessary for their day-to-day operations would survive a major disaster?

For years, corporate America has stuck its collective head in the sand, rather than develop truly effective disaster-recovery planning and capability. But now it's catch-up time. A television station in San Jose, Calif., KNTV, reported recently that companies throughout Silicon Valley are calling the police bomb squad for tips on how to protect their computer rooms and network control centers.

Despite the new awareness of their vulnerability, U.S. enterprises still lag far behind their European counterparts in taking concrete measures for protection. Some years ago, Lloyds Bank International Ltd. built a new headquarters on the banks of the Thames River in London. It was reported that their large computer was to be located in the basement, but before its installation, the directors commissioned an actuarial study to determine the likelihood of the computer room being flooded during high spring tides.

The results were surprising. The study found that the greatest risk to the bank came not from flooding, but rather from a terrorist bomb attack and the resulting loss of information. The bank eventually upgraded its disaster-recovery capability, although it labeled the effort "contingency planning."

As one Lloyds official put it, "We don't have disasters; we plan for possible contingencies."

See **Technology** page 33

Beadsmoore is senior vice-president at Masstor Systems Corp. in Santa Clara, Calif.

INDUSTRY CONFERENCES

IAN ANGUS

ICC '86 heralds ISDN progress

This year's session of the International Conference on Communications (ICC '86), sponsored by the Institute of Electrical and Electronics Engineers (IEEE), was held in my hometown, Toronto. For that reason, I had fewer trepidations than usual about spending three days in dark rooms, looking at hard-to-read slides and listening to dry-as-dust technical talks in the hope that a few nuggets of useful information might emerge.

The word "useful," of course, means different things to different people. No doubt many attendees will get great use from papers with titles like *Combined quadrature amplitude modulation and convolutional codes for cross-coupled multidimensional channels* and *Performance signatures for dual-polarized transmission and cross-polarization interference cancellation of M-QAM signals over fading multipath channels.*

Unfortunately, I missed both sessions, but I'll catch up on them when I get an opportunity to read the three-volume, 1,931-page Conference Record, if I can lift it.

To me, "useful" means relevant to users of business telecommunications services. And only a few of the 60 three-hour sessions, each offering from four to eight presentations, met that criterion. For the most part, these were telecommunications engineers talking to each other about things that could only interest them. The major exceptions were several of the nine sessions on Integrated Services Digital Networks.

Anyone who has followed ISDN at all must be struck by the contradiction between the frequent pronouncements that ISDN is just around the corner and complaints that

See **Standards** page 33

Angus is president of the Angus Telemanagement Group, Inc. in Toronto.

ISDN implementation in the U.S.

Region	Bell operating company	User location	Central Office switch	Architecture	Schedule
Ameritech	Illinois Bell	Oakbrook, Ill. — McDonald's Corp.	AT&T 5ESS	Island ISDN node	Dec. '86-mid-'88
	Wisconsin Bell	Wisc. demonstration	Siemens AG EWSD	Stand-alone	July '85 - Dec. '86
Bell Atlantic Corp.	Chesapeake and Potomac Telephone Co., Bell of Pennsylvania, New Jersey Bell.	Demonstration	NEC Corp. NEAX61E	ISDN adjunct	Sept. '85-3rd quarter '86
	To be determined	To be determined	Siemens AG EWSD	To be determined	mid-'87
BellSouth Corp.	Southern Bell Telephone and Telegraph Co.	Prime Computer, Inc. Trust Co. of Georgia	Northern Telecom, Inc. DMS-100 & AT&T 5ESS	Three interworking nodes	May '87-May '88
Nynex Corp.	New York Telephone Co.	Manhattan — To be determined	Siemens AG EWSD	Basic & primary rate	2nd quarter '87
Pacific Telesis Group	Pacific Bell Telephone Co.	San Francisco	NEC Corp. NEAX61E (& AT&T 1AESS) Northern Telecom, Inc. DMS-100, AT&T 5ESS	Interworking nodes	3rd quarter '87 - '89
Southwestern Bell Corp.	Southwestern Bell Telephone Co.	St. Louis, Mo.	AT&T 5ESS, Northern Telecom, Inc. DMS-100	Island nodes and interworking nodes	May '87-May '88
US West Co.	Mountain Bell	Phoenix — State Government Honeywell, Inc. Telegroup	Northern Telecom Inc. DMS-100	Single node, 3-remote host	Nov. '86-April '87
		Phoneix — GTE Corp. Mountain Bell	GTE Corp. GTD5EAX	Single node, 3-remote host, basic & primary rate, GTE ISDN-capable PBX	Dec. '86-April '87
		Phoenix, Chandler, Ariz. — To be determined	AT&T 5ESS	Optical-remote host	Feb. '87-Aug. '87
		Denver	NEC Corp. NEAX61E	1AESS adjunct	Jan. '86-Nov. '86
	Northwestern Bell	To be determined	NEC Corp. NEAX61E	Three ISDN adjuncts colocated with 1AESS	April-June '87
	Pacific Northwest Bell	Portland, Ore. — US National Bank of Oregon	Northern Telecom, Inc. DMS-100	Island ISDN node	Nov. '86-Nov. '87

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THE ISSUE:

Are industry conferences a waste of time for smart users?

PRO:

BY JOHN B. MOTT
Special to Network World

Industry conferences are a waste of time. If you think differently, you are not being honest with your employer or yourself. Here is what happens during a typical industry trade show.

First, you work extra hours to clear your desk so that you can climb aboard a delayed airplane to travel someplace you are not. Next, you check into a small hotel room, which will cost more than $100 each time you go to sleep, and then you'll spend a few hours finding a place to eat a meal prepared by a chef who was recently fired from your local Burger Heaven and served by a person lacking knowledge of the menu, manners or service.

So much for Day 1.

The next day, you prepare yourself for a day of activity by eating breakfast with strangers who, fortunately, look even more lost than you do. Following breakfast, you munch on an antacid tablet or three as you take a 20-minute walk along dimly lit corridors searching for the first meeting room, which invariably is marked with a cutesy name in half-inch-high letters.

Then you sit in one of a thousand chairs designed for stacking, rather than sitting, and you listen to someone you don't know talk about something you don't care to hear.

When that is over, you spend the next few hours wandering from stall to stall (Isn't the resemblance to a barn remarkable?), collecting four-color brochures, pencils, plastic bags, business card holders and other tripe from people who have some vague hope of selling you products that you don't need.

Wow, time for lunch already. You're off to Ballroom C, where after ignoring some clown who eats your salad and drinks his neighbor's water, you feast on lukewarm Chicken Cordon Blah. Fortunately, the afternoon quickly fades into what is known as hospitality. This means that you are free to wander from suite to suite, eating some frustrated gourmet's idea of gastronomic delight and having someone in a plaid jacket and white socks pour you double Cokes in a paper cup, while you both fumble to exchange business cards.

Marvelous.

For the truly hardy, supper follows. Then, for the dyed-in-the-wool masochist, there is a meeting with some new-found "friends" in the bar, where you can have your ears assailed by a too-loud band and you can imbibe brain-damaging beverages for however many hours you can stand the pain. End of Day 1. Repeat for Day 2, Day 3 . . .

Though I find it hard to be serious about trade shows, there are two general reasons to go to them that have an air of legitimacy: to obtain information and to review new products you may need in your operation.

To obtain information at trade shows, you might either listen to a featured speaker, who may or may not have a germane topic, or you can talk to the marketing people manning the booths (stables). This will enable you to depart with pounds of literature to be read back in your office, although you won't read it because you left it in your hotel room or at the airport when you found that your carry-on luggage was too heavy.

If there were any gems among the rocks, you will then call the company in which you have an interest. The company will then either send the information you need or set up a meeting, and from that point onward, you will discover what you wanted to know in the first place. How much did the trade show contribute to the process? Zip, zilch, nothing, zero.

Now for the notion of going to trade shows to see new products that might be of value to your organization.

Are you going to find the latest digital private branch exchange at a trade show? Are you going to find an operational call detail or automatic call distribution routine you can examine? Not likely.

What you are liable to find are the same four-color brochures, slides of New Jersey antenna fields, and if you're real lucky, a VDT/CRT with incomprehensible gibberish madly dancing across the face of the screen. Want to actually put your hands on a box,

See **Pro** page 33

Mott is director of telecommunications at the Chicago Board of Trade.

CON:

BY ROBERT E. HARRAR
Special to Network World

The question of whether industry conferences are a waste of time for smart users begs for a quick answer, and many users undoubtedly have one to give.

First, the term industry conference must be clarified. An industry conference is an annual association program such as the National Computer Conference, the Federal Office Systems Expo (Fose) and Information Management Exposition & Conference (Info). These programs present seminars for different levels of expertise and often cover multiple technologies. Most national conferences have major exhibitions and events associated with their educational programs.

Just as the computer industry has gone through a growth cycle of innovation, saturation and now a maturation phase, industry conferences have paralleled that same growth pattern. They are now more relevant, more educational and more focused on user needs than ever before.

Industry conferences have left many veteran users jaded. A bit of historical perspective is necessary to bring these skeptics up to date. During the period of innovation in the computer industry in the late 1970s and early 1980s, users couldn't get enough of the technology — computers filled a need. Paralleling this innovation was the users' insatiable need for education. Industry conferences filled this need. What better opportunity to absorb as much information in a three- or four-day period than at a national industry conference that addressed all the major technologies and applications?

As the industry grew, the market became saturated with thousands of companies and products, all vying for a piece of the pie. But the focus and the reason for the growth — meeting users' needs — became secondary to the technology. Users stopped buying.

Industry conferences are a mirror of the industry; they reflect its direction. Just as the technology became confusing and irrelevant to user needs, so did the programs themselves. As a result, many users stopped attending.

The industry is now maturing. Users understand what their needs are and are more aware of applications that they require. The companies that are listening to customers are surviving and are stronger than ever. Industry conferences that are doing the same are also coming back strong. Skeptical users who have been burned or frustrated by industry programs should take a fresh look.

In 1984, National Trade Publications (NTP) contracted with B.R. Blackmarr and Associates of Dallas to conduct a survey of Fortune 500 companies and major government users to develop a consensus on what the ideal program should be. A number of trends became evident and have since been incorporated into all NTP programs as well as most other major industry conferences.

This study showed that users want a quality, in-depth education that addresses their specific needs. The proliferation of in-house and focused single-topic seminars around the country are evidence of user support for programs that address these needs.

Recognizing this trend, most industry conferences are now offering such seminars. The noted speakers and experts who ply their trade in the single-seminar business are now presenting these same programs at major industry conferences. The advantage to industry conferences is that they give users the option to select from a number of prominent speakers addressing relevant topics, usually at a lower cost.

The many options available to users are a major advantage of attending large industry programs. The option to choose from several in-depth seminars and knowledgeable speakers, coupled with the trend of providing single-day, multiple-day or full-conference registration options gives the attendee the best of both worlds.

In addition, large exhibitions held in conjunction with conferences are evolving from the carnival atmosphere of years past, to a serious, get-down-to-business attitude among both exhibitors and

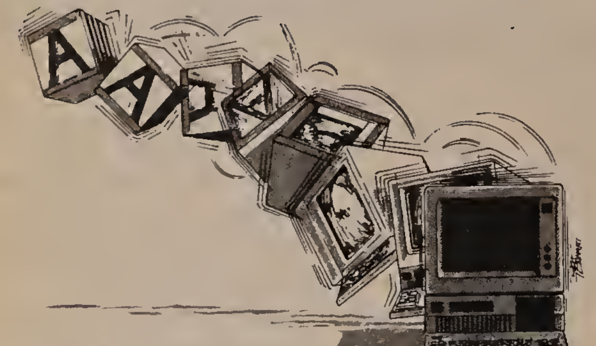
See **Con** page 33

Harrar is the president of National Trade Productions, Inc. in Alexandria, Va., which sponsors Fose and other industry programs.

NETWORK WORLD

Features

July 7, 1986

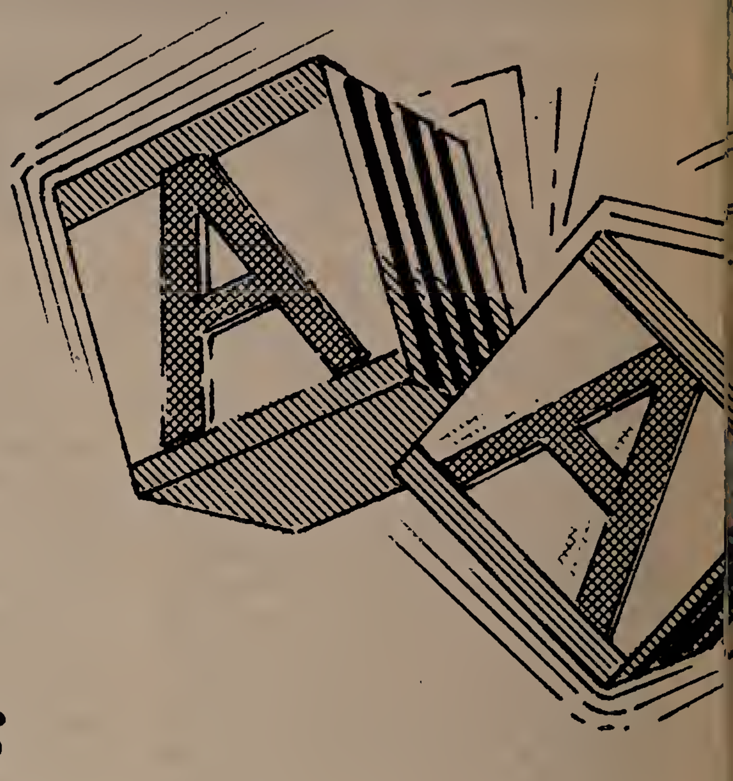


Micros get serious
Relegated to the computing toy box no more, micros are working their way into the corporate net. No longer islands of isolation, micros now share data with their more powerful brethren, off-load processing from busy mainframes and are an integral part of networking strategies.
This page.

The fiber front
While the long-distance fiber front is rapidly advancing, fiber local net technology is less volatile, and prospective users need not wait for emerging standards to buy a system. Current trends in connection, light sources, detectors, wavelenth and fiber type can help users weather the threat of obsolescense.
Page one.

The metropolitan connection
Look out coaxial and microwave, fiber optics are moving to the forefront of metropolitan-area networks. Fiber optics are easy to install, operate and maintain. Voice and data are the popular metro net applications right now, but video transmission on fiber is gaining fast.
Page 31.

Lighting the way with optical fiber
Lightweight, free of interference and immune to noise, fiber optics are too good to be true — and too expensive for some applications. Users should carefully analyze present and future needs before taking the fiber-optic plunge.
Page 32.



RICH TENNANT

An ambitious upstart moves onto the networking fast track

BY MARY PETROSKY
West Coast Correspondent

The second of a two-part series examining the networking implications of computer software design trends.

Despite the microcomputer's humble beginnings as a hobbyist's toy, it has opened the door to the next stage in distributed processing. As it grows into its new role, the micro will perform processing locally, relieve larger computer systems of their processing load and share data transparently across internetworked clusters of native or foreign devices. Unfortunately for users, however, vendors still paint different distributed processing scenarios.

IBM's picture of distributed processing has micros at the bottom and host computers at the top. In between is a river with numerous branches representing differing data formats, communications protocols and other obstacles, says Bob Baden, product manager of new personal computer product programs at IBM's Information Systems Group in White Plains, N.Y. Big Blue's Systems Network Architecture, along with Document Interchange Architecture (DIA), Document Content Architecture (DCA) and other SNA extensions, cuts across the landscape like a highway to give micros access to hosts.

IBM watcher Brian Jeffery calls IBM's SNA strategy "the ultimate in layered approaches." IBM's need to support its wide range of hardware and operating systems means Big Blue is endlessly adding layers to SNA, says Jeffery, who is managing director of the Los Altos, Calif.-based market research firm International Technology Group.

AT&T's distributed processing picture is similar to that of IBM. The communications giant envisions three tiers — microcomputers, minicomputers and mainframes, says Raymond Desjardins, technical supervisor at AT&T Computer Systems Division in Middletown, N.J. Unlike IBM, however, AT&T is looking to a single operating system — Unix — to cement the tiers. Communications protocols that conform to the International Standards Organization's (ISO) Open Systems Interconnect (OSI) model also play a key role in AT&T's strategy.

Challenges of OSI

Layers 1 through 4 of the OSI model, which deal with hardware, are now well defined and accepted as standards. However, the top three layers — the session, presentation and application layers — are more difficult to define because they involve the user interface.

"The higher levels not being formalized tends to slow some of the development at those layers," Desjardins says. "Internetworking will be facilitated when standards are nailed down." Industry sources agree that it will be more than a year and probably two before high-level software standards are determined. One of the toughest challenges posed by the OSI model's higher layers is how to present data and how to access it consistently across networks.

This includes file naming and routing, which is the way information travels from one server to another. Computers vary in how they represent integers, for example, and require some translation, or byte-swapping, to

get data on one machine to mean the same thing to a different machine.

For distributed processing to occur, software developers need to be able to make remote procedure calls — a difficult task even in an environment with homogeneous equipment. (A remote procedure call allows an application to activate a software subroutine on another computer; the result of that procedure is then available to the machine that made the call.)

Homogeneous solutions

Not surprisingly, the most successful internetworking solutions are in homogeneous environments. Digital Equipment Corp., for example, has one of the most sophisticated networking solutions available. The key to DEC's success with Digital Network Architecture is that it uses one operating system and one processing architecture — the VAX architecture — across its whole range of hardware, says Dave Korf, DEC's marketing manager for multivendor networking.

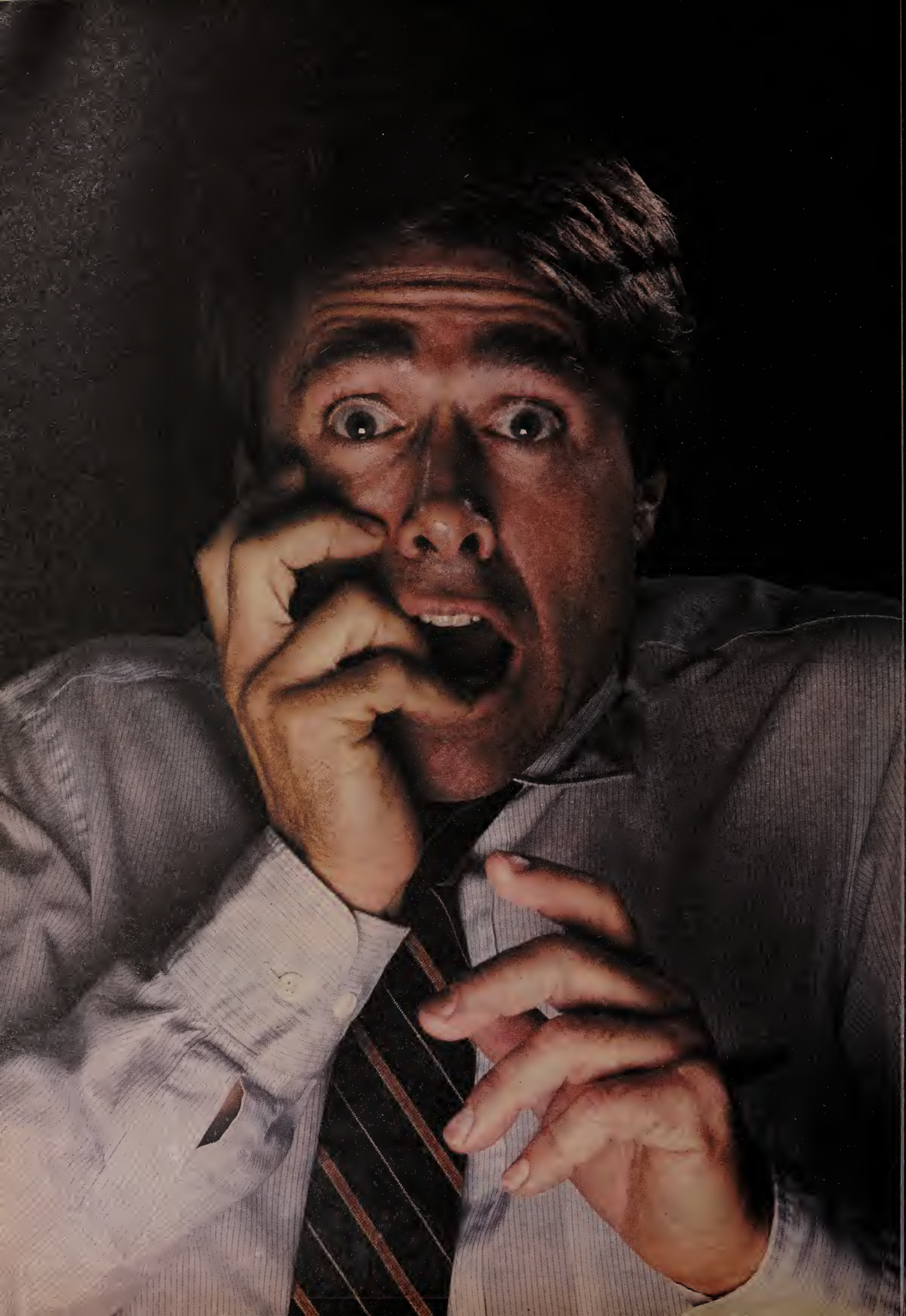
DEC's family of networking products, DECnet, includes network operating software that performs tasks such as file transfers and dynamic network configuration. It also sets up routing tables and supports virtual terminal emulation. DECnet software acts as a bridge between operating systems and allows for peer-to-peer communications between micros and VAXs. Ties to IBM and other environments are through gateways.

Crossing vendor barriers

Using one operating system and distributing it across all hardware allows for nice features, such as common file naming, but most

☞ Continued on **page 28**

Micros get serious



Does the price of optical data links for LANs scare you off?

Who can blame you? At an average price of $150 a pair, data links aren't exactly cost effective. It's enough to frighten even the bravest LAN designer away from fiber optics.

But suppose we were to tell you there's an optical data link available right now that—in volume quantities—costs considerably less than you'd ever expect. Would that make you less fearful?

Well, take heart. Because Lytel is now delivering the most cost effective data links on the market today. Nobody else in the industry can say that with a straight face.

Now while a low price may make you a bit more courageous, it's what you get for the low price that really counts. And what you get in Lytel data links is the highest performance with absolute reliability. Predictable Reliability. And how do we assure that?

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From **page 25**

corporate networks comprise equipment from more than one manufacturer.

A migration of more powerful operating systems, such as VMS and Unix, down to the workstation level would be the ideal solution to the diversity problem, says Eric Killorin, president of Hyatt Research Corp. in Andover, Mass. Network performance suffers when traffic must cut across operating systems. This could become an increasing problem, Killorin predicts, as users become more comfortable with networks and begin to demand better performance.

Users who need to integrate equipment and networks from different vendors shouldn't expect multivendor solutions from the major computer vendors, however, since these vendors are only interested in hooking up their own equipment, Killorin says. "The independents will be key in supporting the multivendor shop," he explains.

O P T E L E C O M

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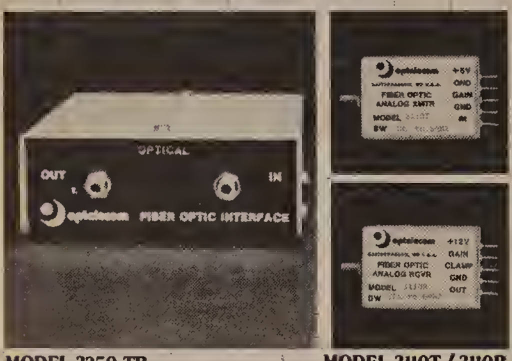

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O P T E L E C O M

Independent solutions

One such independent is Banyan Systems, Inc. Banyan is focusing on connecting different microcomputer local-area networks and providing gateways to larger computers. The Westboro, Mass.-based company promotes the concept of virtual networking, where a personal computer user can access resources on both local and remote servers as if they were local to the microcomputer, says Anand Jagannathan, Banyan's vice-president of systems. Virtual networking also integrates multiple communications technologies and provides a networkwide naming and addressing system.

Banyan and its competitors, such as Novell, Inc. and 3Com Corp., use network services to create a common link across systems. These network services sit on top of any workstation operating system and extend the facilities offered by the local micro's operating system and application programs. Currently, most virtual network vendors only support IBM Personal Computers and compatibles.

One popular extension offered by Banyan is a distributed naming facility that lists all files throughout the network. The naming system is analogous to directory assistance in the phone system, but it makes the connection for you, eliminating the need to work through multiple menus and keystrokes to access files on other systems.

Banyan's architecture is based on a client/server relationship. The company chose to run Unix on its servers to provide multitasking, says Jagannathan, and all services are designed as distributed applications. The user interface runs on the micro, while the server handles data management, gateway functions and communications.

All server processes run on top of Unix. Since Unix lacks real-time features, Banyan integrated communications software into the Unix kernel that provides them. Most virtual net servers support several local-area networks and provide gateways to other communciations environments, such as SNA and X.25. Although virtual networking is maturing, it has drawbacks. For one, vendors need to let users interconnect a wider range of workstations.

In addition, Jagannathan notes, the industry needs to move beyond having workstations access minis and mainframes as terminals. Like other vendors, Banyan is looking to IBM's LU 6.2 as a solution. LU 6.2 would be implemented on a server, with an interface to it on the micros and applications providing support on the mainframe side.

"People extend virtual networking to a lot more than what it is," Jagannathan says. He defines virtual networking as a set of tools, not the applications that do data extraction and conversion, and anticipates that these capabilities and other distributed applications will become available in 1987.

Dan Ladermann of The Wollongong Group, Inc. in Palo Alto, Calif., confirms that a number of data base vendors are working on distributed applications. What's available today is actually distributed filing, says Ladermann, vice-president of advanced products. Wollongong was one of the first companies to run Unix software under a hardware manufacturer's native operating system.

Out of this porting work have grown families of products, including networking systems that implement the U.S. Department of Defense's Transmission Control Protocol/Internet Protocol (TCP/IP). TCP/IP is a set of layered protocols that fit above the local network access protocols and below network applications such as file transfer.

The demand for distributed processing — and the components necessary to make it work, such as a distributed file system and so-called network operating system or network services — have only begun to emerge as users find a way to connect physically various pieces of hardware, Ladermann says. Many universities are using the TCP/IP networking protocols to connect hardware ranging from Cray computers down to microcomputers. Some large companies that don't want to wait for OSI products are also going this route.

Reaching new heights

Some work has already been done on the upper levels of the OSI model, particularly in the area of filing systems. Two such systems are the Network File System (NFS) from Sun Microsystems, Inc. and AT&T's recently introduced Remote File Sharing (RFS) system.

Currently, more than 40 computer vendors and 20 universities have licensed NFS, according to John Hime, director of product marketing at Sun Microsystems in Mountain View, Calif. NFS is machine- and operating system-independent, and it allows users on a network transparent access to files on other systems. Sun recently extended NFS to IBM Personal Computers and compatibles; PC-NFS allows users of these microcomputers on Ethernet networks to enter DOS commands and transparently access files on other computers running NFS. Although other network users can't directly access files on the micros, the micro user can arrange to have his files automatically sent to a network server for sharing.

AT&T has also taken a crack at the filing system issue with RFS, a feature in Unix System 5 Release 3.0, which became available in June. RFS allows users to share local and remote files as well as peripherals on the network. RFS also makes it easier to support Unix workstations, since it provides standard hooks for accessing remote files, Hime says.

NFS and RFS are redundant in some areas and complementary in others, Wollongong's Ladermann says. A debate may ensue as to which will survive, but Ladermann believes both file systems could succeed as long as they can interoperate. While both Sun and AT&T say the two file systems operate independently, they can coexist on the same computer within a network.

In addition to a distributed filing system, Ladermann says distributed processing needs to be able to make remote procedure calls. Such calls are at the foundation of NFS, Hime says. Sun even has a system for handling the presentation of data. The company's External Data Representation system acts as a common language between heterogeneous machines, handling byte-swapping and other presentation problems. Sun also offers a Yellow Pages service that lists the names and passwords of all network users. Sun plans to add to its network services and intends to release its Remote Execution Compute service this fall. This service will let companies or departments share specialized computer resources, such as sophisticated graphics workstations, Hime says. Sun is also exploring a network window service.

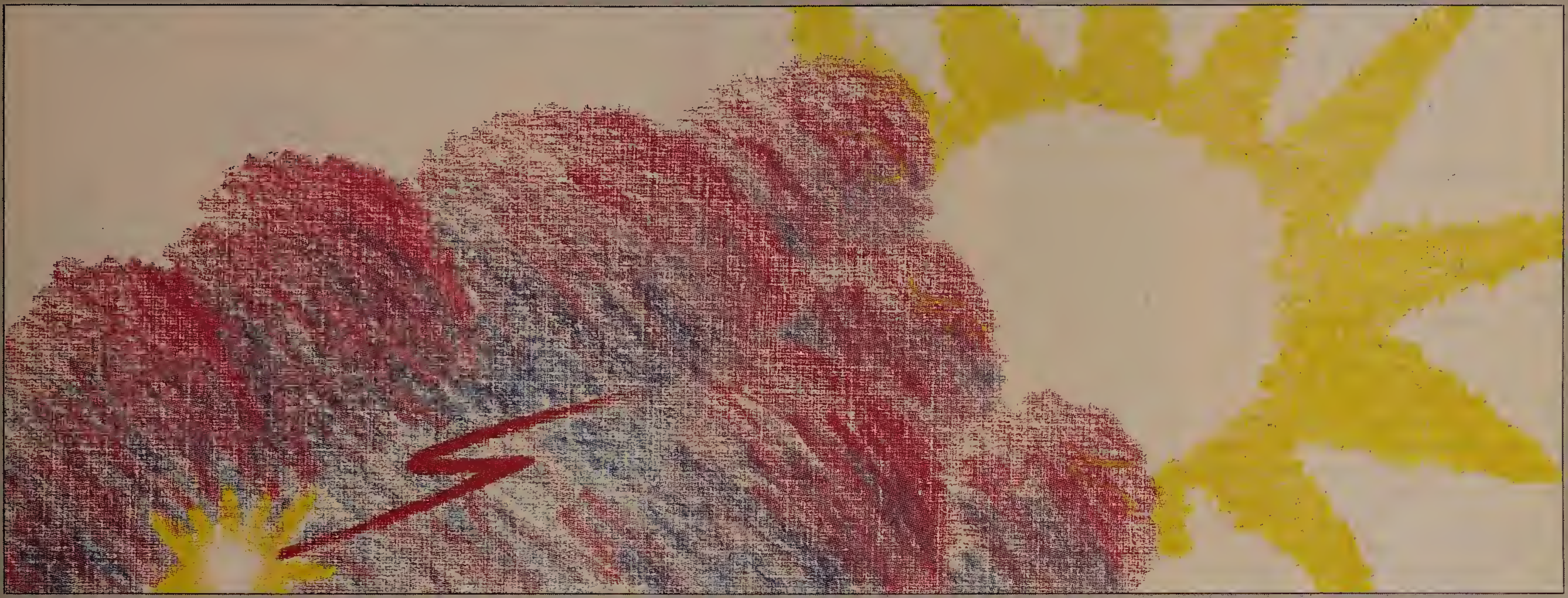
"[The move toward internetworking] is where more complex network operating systems become a requirement," says Wollongong's Ladermann. Regardless of how it's built, a network operating system's primary tasks will be to know where everything is and to control networkwide resources, Ladermann notes. Consistent with the services approach now being used by several vendors, network operating systems will be layered, because the operating systems on individual computers won't go away, Ladermann says.

Managing the net

As the software components needed to accomplish distributed processing fall into place and internetworking becomes a reality, a critical question arises: Now that we can build it, how do we manage it? Large, distributed networks present a different set of management issues than minicomputers, says AT&T's Desjardins. Both the data and system intelligence are distributed, whereas in minicomputers these are contained in one box. Creating distributed data bases is hard to do well, in part because of synchronization problems, Desjardins says. Artificial intelligence and knowledge bases are likely to come into play in keeping track of large distributed networks, says Wollongong's Ladermann.

Much of the hardware for internetworking is in place. Vendors are now developing the software layers needed to glue the hardware together. As always, adherence to standards — whether de facto standards as they emerge or specifications that come out of a standards-making body — will greatly speed the process. By putting pressure on vendors to come up with generic connections, users can hopefully sway vendors away from proprietary solutions. ◻

SPECIAL SECTION: Fiber Optics



The fiber front

Continued from page 1

applications. But upon closer inspection, the lack of standardization in the fiber industry makes some potential fiber users uneasy. Is there a best choice for local-area network fiber? The rapid evolution of the fiber industry is legendary. How can you be sure what you install today won't be obsolete in another year or two?

Help is on the way in the form of standards, both formal and de facto. But as is the case for any industry still in its infancy, a settling time is associated with standards resolution. The Accredited Standards Committee X3T9.5 of the American National Standards Institute is specifying the physical media-dependent (PMD) layer of the Fiber Data Distributed Interface (FDDI), a 100M bit/sec token ring. But Ansi review and approval is not expected until late this year, and no other formal standardization efforts are presently underway. With IBM promoting one fiber type and AT&T another, many users are confused. But, there's no need to wait for everything to settle down. By paying close attention to the emerging de facto standards and listening to the formal standards given in early FDDI reports, users can install fiber today that will serve their fiber local net needs for years to come.

Fiber options

When making the investment in a fiber-based local-area network, users often fear that rapid advances in fiber technology will make their network obsolete. Careful scrutiny of the latest advances reveals, however, that these advances are providing greater capacity over longer distances in the long-haul world of telephony applications.

For short-haul applications, the most notable progress is being made at either end of the fiber: cheaper light sources and detectors; and more efficient couplers and switches. One of the beauties of fiber optics is that users of existing fiber networks can upgrade their systems by merely replacing the terminal equipment. But what type of fiber should be installed?

The user first must choose between single- and multimode fiber. Multimode fibers possess fairly large core-to-cladding ratios (the ratios of the diameter of the fiber's core to its outer cladding section) that enable a large portion of the incident light power to be accepted by the fiber.

The climate is improving for fiber local nets.

However, they also allow the propagation of that light in several modes, or propagation paths. Considering these modes as different paths of travel, one can see how an incident pulse with rapid rise and fall times spreads as it travels through the fiber. This multimode dispersion limits the use of multimode fibers in applications where large bandwidths are required for long distances. In single-mode fibers, the core is only a few light wavelengths in diameter, and the fiber supports only one propagation path.

Eliminating multimode dispersion enables these fibers to carry large bandwidths for long distances. Unfortunately, the same characteristic that eliminates the multimode dispersion problem also creates another in the area of light coupling. A small core diameter necessitates the use of expensive laser sources to feed required power into the fiber. In addition, fiber alignment at junction points is more difficult.

For local net applications, this conflict has become almost a nonissue. Local-area networks have a high concentration of connections, each containing an optical source and a detector. Because of the expense involved in terminating and feeding light into single-mode fibers and the fact that multimode fibers are more than able to support the data requirements of most local-area applications, both the industry and the X3T9.5 standards committee have chosen multimode fibers for local applications.

The question of composition

Perhaps the most widely debated area of standardization involves the core-to-cladding ratio. Many types of multimode fibers are currently available, but the most commonly used are those with 50/125, 62.5/125, 85/125 and 100/140 core-to-cladding ratios. In general, smaller core sizes provide for higher bandwidth; because the fiber supports fewer modes, the smaller core size

☞Continued on **page 30**

Reinhold is a staff consultant with Network Strategies, Inc., a telecommunications consulting firm based in Fairfax, Va.

> *"The most popular connectors are the biconic and the SMA resilient tip connectors."*

From **page 29**

reduces multimode dispersion. Larger core sizes enable more optical power to be fed into the fiber and facilitate low loss at connection and switching points.

De facto standards for core-to-cladding ratios are specified by the building wiring plans of AT&T and IBM. AT&T's Premises Distribution Scheme (PDS) specifies 62.5/125 multimode fiber, and AT&T designs its equipment with an appropriate interface. Big Blue, on the other hand, specifies 100/140 fiber in the IBM Cabling Plan.

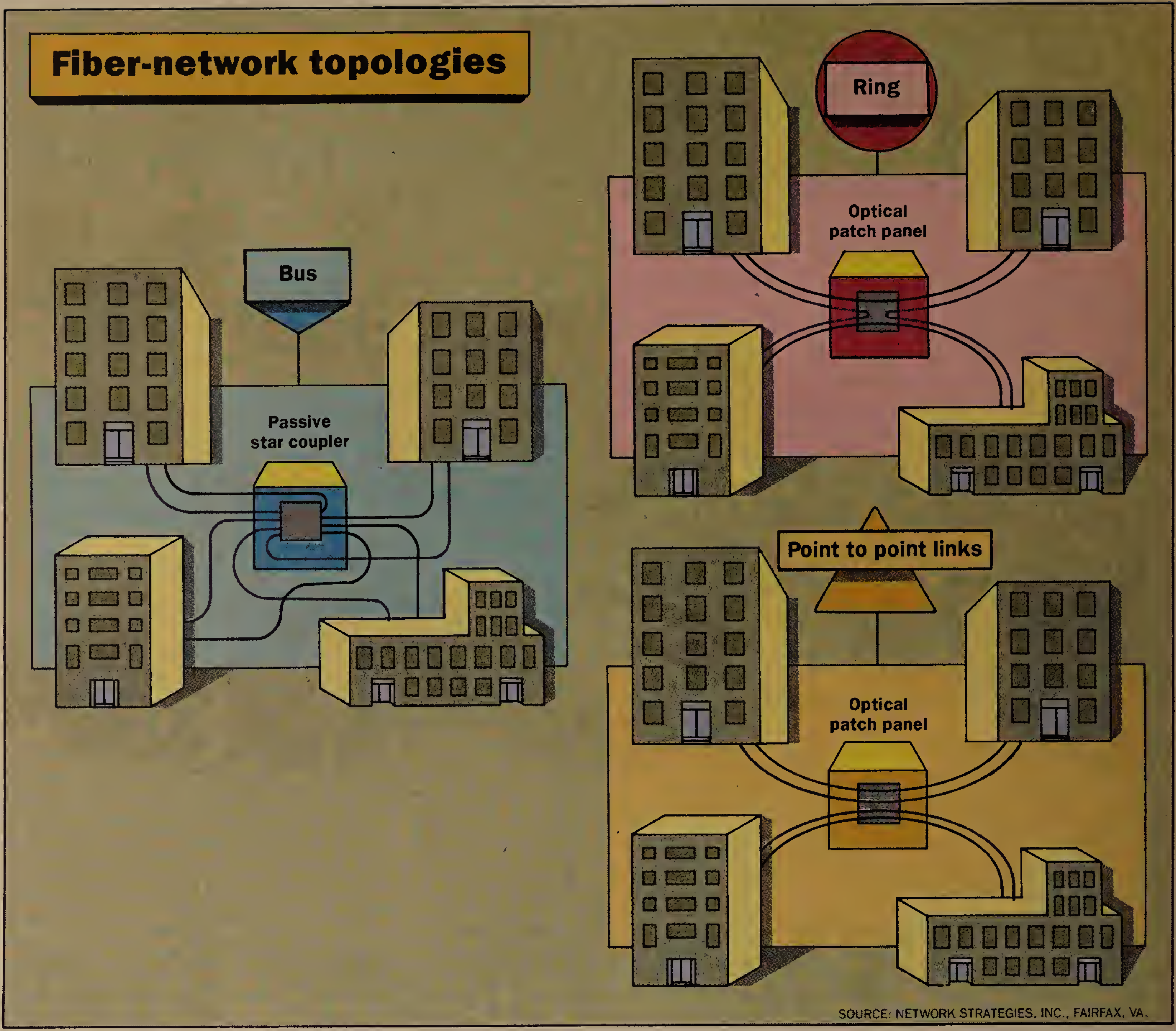
The FDDI standard appears to be heading toward an agreement with the AT&T standard. Rumors are rife that IBM may be changing the fiber in its Cabling Plan to a smaller core-to-cladding ratio.

Users who wish to wire their buildings with optical fiber should install 62.5/125 multimode fiber.

This fiber offers two major advantages. First, it adheres to the PMD layer specified by the FDDI. While there is no guarantee that this standard will catch on, it is the first serious effort at fiber network standardization and is widely supported in the industry.

Second, 62.5/125 fiber is available from a number of vendors and is used in the AT&T PDS. The PDS is one of several highly modular building wiring schemes that recently hit the market. Modular and well-organized wiring is a concept that anyone wiring a building should strongly consider.

By choosing the proper topology, users can make their installed fiber a highly flexible communications resource. Perhaps the most versatile topology is pairs of fibers emanating from wire centers in a star. The figure at right shows how to configure such a layout to form the basis of a token ring, a bus-emulating network for use with a fiber-based Ethernet network or simply a collection of high-speed point-to-point links.



SOURCE: NETWORK STRATEGIES, INC., FAIRFAX, VA.

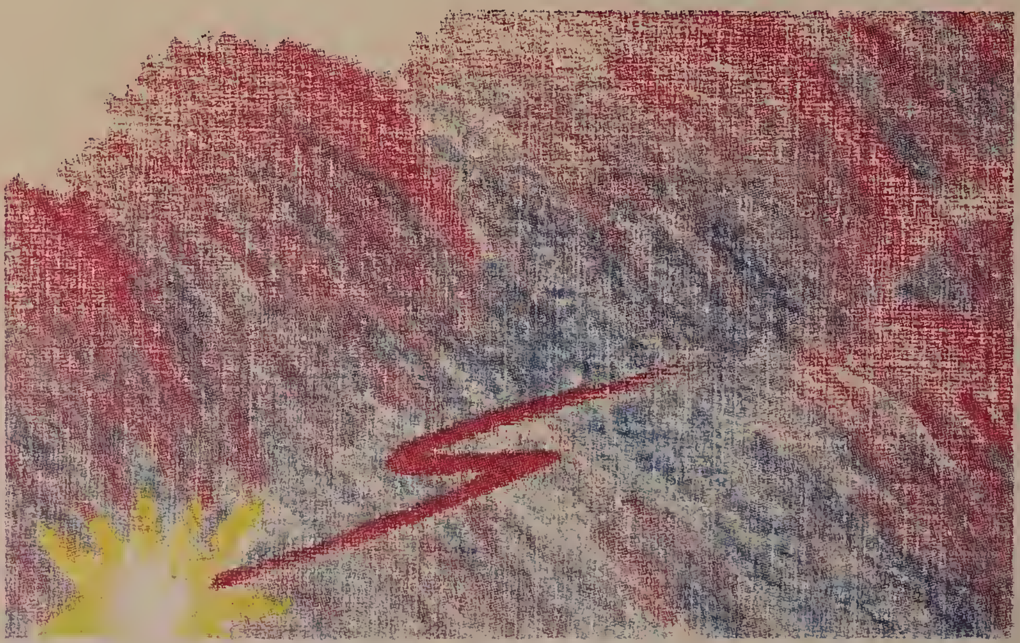
Giving notice to terminations

The next big user decision concerns the ends of the installed fiber. At issue here are:

- Which connectors are most efficient: biconical, SMA or another type?
- Should one use lasers or LEDs as a light source?
- Which of the semiconductor-based optical dectectors is better, avalanche photo-diodes (APDs) or positive intrinsic negative diodes (PIN diodes)? (Detectors convert light signals into electrical signals.)
- What wavelength is best for transmission?

As yet, no real effort has been made toward connector standardization. Many types of connectors are available, but the most popular are the biconic and the SMA resilient tip connectors. (SMA, now a generic term, is the subminiature series A of Allied Amphenol Products, a division of Allied Corp.) Properly attached, the two offer equally low signal losses.

The North Atlantic Treaty Organization has proposed using the SMA connector for military and instrumentation standards, but this is still under consideration. The de facto standard seems to be a biconic connector designed by AT&T Bell Laboratories that gained much of its popularity through its extensive use in telephony applications. IBM has specified a biconic connector as the standard for the fiber portion of its Token-Ring local-area network.



> *"Nato has proposed using the SMA connector for military and instrumentation standards, but this effort is still under consideration."*

Users would do well choosing either connector type, but since the industry is strongly leaning toward the biconic connector, this might be the better choice. Standardizing one connector throughout the physical plant will enable users to move equipment without worrying about connector incompatibility.

No formal standards are in place for optical sources or detectors. Most short-haul (under 2 km.), medium-speed (under 150M bit/sec) applications can be served using LEDs and PIN diodes. Since lasers and APDs are more expensive and more dependent upon environmental controls than LEDs and PINs, there is usually no reason to install them in most local net applications, except when very high bandwidths are required.

IBM and AT&T are each promoting their own versions of competing de facto fiber standards by including fiber in their building wiring plans and producing optical fiber interfaces for their equipment. Formal fiber local-area network standards will soon appear from Ansi in the form of FDDI.

The fiber-optic components chosen for FDDI will benefit from inclusion in the standard. Public acceptance of the standard may lead to greater demand for approved components, and mass production should lower component costs. By taking a close look at these emerging standards, users can install fiber systems today that will serve their high-speed local network needs well into the future. ◻

SPECIAL SECTION: Fiber Optics

At the speed of light

PETER PERRY

Fiber optics invade the city; cabling options may never be the same.

BY ROBERT J. HOSS
Special to Network World

Fiber optics has gained popularity in the metropolitan-area network environment primarily because, when used to capacity, it is inexpensive and easy for commercial businesses to implement without a heavy investment.

Metro-area nets transport signals within a city or local access and transport area, between buildings, distribution nodes or local-area networks. They also operate as local distribution for wide-area network traffic.

From an applications standpoint, metropolitan networks generally involve:

- Local-exchange carrier activity.
- Alternate access from a long-haul carrier's customer premises to the carrier's point-of-presence.
- Private networks, interconnecting office buildings, business complexes or local-area networks.
- Cable television (CATV) networks involved in the transport of entertainment, education and business data traffic.

The transport medium is generally twisted-pair copper wire, coaxial cable, line-of-site microwave or fiber.

Why fiber optics?

Fiber optics is a relatively simple transmission medium. For most applications, it transmits baseband binary signaling without any complex intervening modulation. Once the fiber is selected and installed, concern for the transmission medium is minimal because there are no plant electronics. The characteristics of the cable are stable with temperature, time and electromagnetic interference.

In metropolitan-area networks, other transmission media have their disadvantages. With microwave, there are often variables such as noise interference, environmental fade, physical blockage and Federal Communications Commission regulations that hinder transmission. Coaxial cable suffers from interference and changes caused by temperature, corrosion and degradation. Because coaxial is subject to changing characteristics, plant electronics require constant maintenance. Twisted-pair is susceptible to changing amounts of interference and cross talk.

Systems architecture for optical fiber is simple, generally consisting of fully modular end terminals with no electronics in between. When following vendor guidelines, design is generally straightforward. Installation is simplified by the small, light, rugged nature of the cable, and nearly all major cable construction firms will perform turnkey plant installations, including splicing.

Properties of the fiber cable permit it to be lashed on top of another existing cable, plowed directly into the ground in 5- to 10-kilometer spans or pulled continously through thousands of feet of duct around multiple bends.

Maintenance is low and operation requirements small because the equipment is modular, requires no setup or periodic adjustment and contains microprocessor-based self-diagnostics. Other than for accidental physical damage done to the fiber cable, plant maintenance is minimal.

When is fiber applicable?

Fiber is suitable in the metro-area network when transmission capacities are large, meaning greater than 1M bit/sec. Other conditions that favor the use of fiber are transmission distances longer than twisted-pair cable can handle without repeaters, and environmental challenges presented by noise, temperature and humidity. Fiber is less practical when an application requires distribution of low-capacity signals to a large number of users, such as CATV distribution.

Fiber is generally used in transmitting the following:

- High-speed data or data packets at 1M to 10M bit/sec or higher.
- Pulse-code modulated voice traffic where multiple T-1 channels are required.
- High-quality broadband video transport for broadcasters or CATV supertrunks.
- Communications within a point-to-point or ring architecture.

Fiber optics vs. coaxial cable

Coaxial cable is considered a chief broadband competitor to fiber primarily because of its presence as CATV in metropolitan areas (see chart on page 32). In most areas, CATV franchise

☞ Continued on **page 32**

Hoss is vice-president of engineering for American Express TRS Telecommunications in New York.

owners are able to carry data traffic on coaxial for businesses.

Much interest and debate surrounds the issue of combining telephone and entertainment video traffic to use the installed base of coaxial for total broadband networking.

For the most part, however, coaxial for business communications has remained in the background because of the lack of interest on the part of CATV companies and because of the regulatory issues affecting the ability of local exchange and long-haul carriers to involve themselves in the CATV side of the business.

When voice or data travels over a CATV operator's cable in the coaxial implementation, individual transmission channels are carried on separate pairs of frequencies. These frequencies are grouped in one band for transmission and in another band for receiving. The transmit signal is routed back to the hub where processors translate it into the receive band and reinsert it on the cable. Terminals are assigned specific transmit and receive frequencies.

With the fiber implementation, each transmission channel is carried on a separate pair of fibers, one fiber to transmit and one to receive. Crossconnecting or routing over the trunk involves electro-optical conversion at the hub.

Dedicated point-to-point routing makes use of an inexpensive optical fiber crossconnect at the hub. Termination to the fiber cable involves splicing it into a pair of fibers within the cable.

This must be carefully planned since all fibers must be spliced at each designated point.

The most cost-effective situation would be to have a network that could combine the low-volume cost benefits of coaxial for the lower traffic locations and provide fiber for the higher capacity locations. This architecture would be a natural next step for a CATV company that has already invested in the coaxial data network cable. By adding fiber trunks and drops appropriately, the cost and quality advantages of fiber can be actualized with a graceful introduction

> *“Coaxial remains in the background.”*

Fiber optics compared with other media
(Based on a 10-mile span supporting 50 to 100 6-MHz video channels)

	Frequency-modulated four-conductor coaxial	Amplitude-modulated four-conductor coaxial	Microwave	Fiber optics
Number of amplifiers	≈56	56	0	0
Number of cables needed to support 100 channels	4	4	0	1
Channel capacity	25 per cable	25 per cable	50-70 bandwidth limit	6-10 per wavelength; 100 per cable
Installation	Aerial or underground; .3 km to 1 km maximum pull length	Aerial or underground; .3 km to 1 km maximum pull length	Towers	Aerial or underground; easier than coaxial; 2 km to 3 km maximum pull length
Cost installed (includes headend)	$11,000 per channel	$5,000-$6,000 per channel	$22,000* per channel	$7,000-$11,000 per channel

* Microwave costs decrease on a per-channel basis as more hubs are added.

SOURCE: ROBERT J. HOSS AND ART SIMON, NEW YORK

▶ FIBER-OPTIC PRIMER

Lighting the way with optical fiber

Fiber optics emerge from local nets as a general-purpose cabling alternative.

BY DAVE MONK
Special to Network World

The subtechnology of fiber optics is dazzling communications users and advancing at a more rapid pace than its source — local-area networks. This is because optical fiber can do much more than support local nets. Its unique properties have nurtured one of the fastest growing segments of the communications industry.

The primary reasons for the increased interest in fiber optics are the following:

- High bandwidth, small size and weight. An optical fiber cable that is 3/4-inch in diameter will carry up to 100 times more data than a coaxial cable three times its size.
- Immunity to noise. Because it sends light, fiber-optic cable is immune to electrical emissions and other noise. It emits no noise to interfere with delicate instruments or other electronic systems already installed.
- Interference-free transmission and security. Optical fiber cannot be tapped like wire. Breaking the fiber is easily detected and can set off alarms.
- Low signal loss. Signals can be sent 50 miles without repeaters in everyday use, and even further in the near future.

One of the biggest assets of optical fiber is its long life. The bandwidth of fiber is not being greatly taxed today. The electronics needed to drive it at peak capacity are not cost-effective right now, but they will be in time, so fiber installed now can grow with communications demands. In a comparison of optical fiber to copper cable technology, fiber is more expensive per foot. However, optical fiber allows users to put in one cabling system and forget about any other cables.

Fiber technology is finding increased use in such routine data communications applications as terminal multiplexing.

As an example of how close fiber optics can come to the cost of conventional installations, multiplexing is a good subject to use as a point of comparison.

A quick survey of conventional eight-port asynchronous multiplexers shows prices ranging from $650 to $1,700, with more multiplexers priced on the high side of the $1,000 mark. The price for eight-port fiber-optic multiplexers is almost the same as that of wire-based multiplexers.

For high-speed applications such as computer graphics, computer-aided design and manufacturing (CAD/CAM) equipment connections or CPU-to-CPU links, fiber becomes cost-effective at distances of 100 feet and less (see chart below).

There are many kinds of optical cable with different types of insulation and wavelengths. But for straightforward jobs such as multiplexing, users won't need anything exotic unless they are transmitting in unusual environments. Generally, optic cable costs about 30 cents per foot per single direction. This is a bit more than common coaxial. Installing the cable may be more expensive than the price of the cable itself.

Comparision of fiber with coaxial cable installation is startling. One kilometer of coax is a lot heavier than a kilometer of fiber. It takes three people and a truck to handle the coax. Fiber takes two people and no vehicle. To wire a multistory building with coaxial cable might take six workers one month. They would have to install special anchors in any vertical rise to support the weight of the coax.

The same job done with optical fiber might take two workers about a week and a half because the fiber can support its own weight.

Make the effort to do the proper analysis, and it could pay off handsomely. What many have discovered is that any initial extra cost will become insignificant as time goes by.

Price and performance have made fiber optics popular with telephone companies for voice communications, with broadcasters for video transmission, with computer graphics users for CAD/CAM and with communications users for high-speed data transfer. Because of its security and light weight, the military uses it widely.

The market for optical fiber technology is expected to grow at 35% for the next several years. In the data processing segment, it is a new market. But the promise of fiber for integrated voice, data and video communications is rapidly moving it to the forefront of communications network planning.

In comparing fiber to wire, there are many things to consider. The distance, speed, amount of signal loss, security level and type of surroundings are just a few of the issues that must be addressed before deciding that optical fiber is the answer.

Monk is director of marketing for Artel Communications Corp. in Worcester, Mass.

Fiber-optic cable vs. copper cable:
Effective transmission distance for specific applications

Applications	Copper cable type	Maximum copper cable length	vs.	Maximum fiber-optic cable length
Medium-resolution graphics	75-ohm coaxial	250 ft.		10,000 ft.
High-resolution graphics	75-ohm coaxial	50 ft.		1,000 ft.
DMA transfer VAX to peripheral	Ribbon cable	10 ft.		3,000 ft.
Video and audio	75-ohm coaxial	1,000 ft.		100,000 ft.
Ethernet local net	"Yellow" cable	1,500 ft.		100,000 ft.

SOURCE: ARTEL COMMUNICATIONS CORP., WORCESTER, MASS.

NETWORK WORLD

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1

My primary areas of activity. Circle ONE only.

I am involved in evaluating communications (data, voice and /or image) products and services:

1. for *use within my own* company/organization
2. for *resale* to other companies/organizations
3. Both

1a

For communications, my primary responsibility is: Circle ONE only.

1. Data Communications
2. Voice Communications
3. Both

2

Circle only the ONE title classification which most applies to you.

Company Management

11. Chairman, Pres., Owner, Gen. Mgr., Partner, Director, CIO, VP, Dir. Head of Finance, Admin. Procurement

Communications Management

Data Communications

21. Management
 VP, Dir., Mgr., Head, Chief: Data Communications, including Networks, Engineering, Design, R&D, Application Development
22. Supervisory/Staff
 Supervisor, Head : Networking, Design, Analysis, Engineering, R&D, Applications, Services

Telecommunications

31. Management
 VP, Dir., Mgr., Head, Chief: Telecomm., Voice Comm., including Networks, Engineering, Design, R&D, Application Development
32. Supervisory/Staff
 Supervisor, Head: Networks, Design, Analysis, Engineering, R&D, Applications Services

Factory Communications

41. Management
42. Supervisory/Staff

MIS/Data Processing

51. Management
 VP, Dir., Mgr., Head, Chief: MIS/DP, Systems Application Development, Operations, Office Automation
52. Supervisory/Staff: Supervisor, Head of System Design, Analysis, Applications

Others

75. Consultant
80. Educator
85. Financial Analyst
90. Marketing/Sales
95. Other ______________________

3

Job Function

Which one of the following best describes your functional involvement with communications (data, voice, and/or video) products? Circle ONE only.

Corporate

1. Business Management, Planning and/or Development

Communications System/Network

2. Management, Planning and/or Development
3. Implementation and/or Operation
4. Other ______________________

4

Which one of the following best describes the primary business activity of your organization at this location? Circle ONE only.

Consultants

11. DP/Communications Consulting Services
12. Consulting Services (except DP/Communications)

End Users

13. Manufacturer (other than computer/communications)
22. Finance/Banking/Insurance/Real Estate
23. Education
24. Medicine/Law
25. Wholesale/Retail Trade
26. Public Utility/Transportation
27. Mining/Construction/Petroleum Refining/Agriculture/Forestry
28. Business Services (excluding DP/Communications)
29. Government: Federal
30. Government: State/Local

Vendors

41. Carrier: including AT&T, BOCs, Independent Telcos, Public Data Networks, Intern'l Records Carriers
42. Interconnect
43. Manufacturer Computer/Communications Equipment
44. Value Added Reseller (VAR), Systems House, Systems Integrator
45. Distributor
46. DP/Communications Services (excluding consulting)
95. Other ______________________

5

In which ways do you typically become involved in acquiring communications products (data, voice, and/or video) and services? Circle ALL that apply.

1. Recommend/Specify
2. Identify/Evaluate Potential Vendors
3. Approve the Acquisition
4. None of the Above

6

Check ALL that apply in columns A and B.

A. I am personally involved in the acquisition process (specification, selection, approval) for the following products and services:

B. These products and services are presently in use at this location:

	A	B	*Product/Services*
Computers			
01.	☐	☐	Micros
02.	☐	☐	Minis
03.	☐	☐	Mainframes
Data Communications			
04.	☐	☐	Communications Processors
05.	☐	☐	Comm./Networks Software
06.	☐	☐	Digital Switching Equipment
07.	☐	☐	Facsimile
08.	☐	☐	Modems
09.	☐	☐	Multiplexers
10.	☐	☐	Protocol Converters
11.	☐	☐	Network Mgmt. & Control
12.	☐	☐	Test Equipment
13.	☐	☐	3270 Controllers
Telecommunications			
14.	☐	☐	PBXs
15.	☐	☐	Key Systems
16.	☐	☐	Central Office Equipment
17.	☐	☐	Integrated Voice/Data Terminals

	A	B	*Product/Services*
Transmission/Network Services Equipment			
18.	☐	☐	Microwave
19.	☐	☐	Satellite Earth Stations
20.	☐	☐	Local Area Networks
21.	☐	☐	Wide Area Networks
22.	☐	☐	Packet Switching Equipment
23.	☐	☐	Fiber Optic Equipment
Communications Services			
24.	☐	☐	Packet Switching Services
25.	☐	☐	Cellular Mobile Radio Services
26.	☐	☐	Electronic Mail
27.	☐	☐	Enhanced Services
28.	☐	☐	Centrex

7

Estimated value of communications systems, equipment and services:

A. which you helped specify, recommend or approve in *last* 12 months? Check only ONE in column A.

B. which you plan to specify, recommend or approve in *next* 12 months? Check only ONE in column B.

	A	B	
1.	☐	☐	Over 10 million
2.	☐	☐	$5-10 million
3.	☐	☐	$1-5 million
4.	☐	☐	$500,000-1 million
5.	☐	☐	$250,000-500,000
6.	☐	☐	$100,000-250,000
7.	☐	☐	$50,000-100,000
8.	☐	☐	Under 50,000
9.	☐	☐	Don't know

8

Estimated gross annual revenues for your entire company/institution:

Circle only ONE.

1. Over $1 billion
2. $100 million to $1 billion
3. $5 million to $100 million
4. Under $5 million

9

Estimated number of total employees at this location:

Circle only ONE.

1. Over 5,000
2. 1,000-4,999
3. 500-999
4. 250-499
5. 100-249
6. 50-99
7. 20-49
8. 1-19

3A05-36

NWW1

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2. Answer all questions
3. Sign and date form

THANK YOU.

Network World

The Weekly for Leading Users of Communications Products & Services

PLEASE TAPE HERE

period and with only a moderate investment.

This hybrid configuration would also be natural for a local-exchange or alternate access company that intends to move into video or CATV as well. For any new network installation, there is always a tendency to install strictly fiber, if only for its market prestige. These decisions should be weighed against the lower cost of a coaxial and fiber hybrid network.

Video over fiber in the metro-area network?

Video transmission in the metropolitan network has generally been applied to CATV, videoconferencing, broadcast feeds and closed-circuit video systems like security and traffic monitoring systems.

For the most part, all of these applications require point-to-point trunks and, except for CATV, a single channel or a small number of channels per link. CATV, on the other hand, requires both the trunking and distribution of 50 to 100 color video channels throughout a metropolitan area.

Connecting individual homes with fiber in a tree distribution architecture, as CATV does, cannot compete with the conventional coaxial approach. The primary application of fiber in CATV systems today is in trunks. The costs and power losses associated with the connectors and splitting components necessary for feeds to individual buildings are too great. If someone wants a link from his home, fiber becomes more economical when telephone and CATV video are combined in a star topology that serves multiple dwellings and provides a local integration and switch point for voice, video and data.

In the past, coaxial and microwave have been the only technologies accepted by the CATV industry. In general, fiber has been applied to video on a single-channel-per-fiber basis in applications such as broadcast feeds, where quality requirements outweighed the cost considerations. Fiber, however, should be applied intelligently to metropolitan nets. Attempting to replace low-speed, short-distance twisted-pair circuits with fiber is a mistake.

Until a few years ago, multimode was the only fiber technology available, but it was expensive and only marginally better in performance than coaxial. Those in the CATV industry questioned the reliability and maintenance requirements of multimode because repeaters were necessary in certain CATV applications. Currently, single-mode fiber is being used to connect with LEDs over shorter distances in metropolitan networks. Single-mode is becoming the dominant technology because of its wide bandwidth and low loss, and metro-area nets are on the borderline of the multimode vs. single-mode trade-off. Wherever practical, single-mode fiber should be explored.

Fiber optics can play a key role in nearly all metro network applications. Although data and voice transmission have attracted the most interest for fiber applications within metro-area nets, video transmission on fiber has a definite application in areas where conventional methods, such as coaxial and microwave, are not adequate.

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Pro from **page 23**

exercise a system or do keyboard things with VaporWare, Inc.'s latest costing routine? Not a chance.

The marketing types would break into a cold sweat.

You can have a lot of good clean fun though, by holding someone's latest interpretation of a key telephone over your head and asking the boothee if you can stress-test the device.

Are trade shows a bad thing, sufficiently evil for banishment forever? Certainly not! They are grand places to go for a break in your normal routine. But do you have a good enough relationship with your boss to say, "Fred, I'm tired, and I need a break, so why not let the company pay for a small vacation for me?"

If your ego swells at the thought of having your very own business card ensconsed in a clear plastic luggage tag "While-U-Wait," by all means go, and take a spare suitcase for the goodies. If you're not happy with your present situation, pack your resumes and find a large trade show: The hunters of heads are always lurking about.

Trade shows are not seminars, nor are they technical courses or users groups. These critters all have value, just as long as you know what to expect.

Trade shows present no compelling argument for my time, particularly when I compare what can be accomplished for my organization and my career to the time I would have to allocate to attend these events.

Unless, of course, I were to become enthralled with a chance to win my very own free telephone — drawing to be held on the fourth day at Booth 3189 on the lower concourse . . .

Con from **page 23**

sponsors. There is also a trend toward integrating conference sessions with the products on display, thus providing a total educational experience.

Interaction — peers talking with peers — was the most important trend resulting from the survey. In response, many of the large industry programs have begun to plan events that promote interaction among attendees. In a survey of Fose attendees, one of the most often mentioned benefits to attendance was the one-on-one discussions that occur among peers. These allow the attendee to get a clearer focus on the big picture — not just on what he is experiencing, but with other technologies as well.

Finally, there is no better opportunity to absorb so much information, utilize so many resources in one place and receive the quality, focused education users require than at many of today's industry conferences.

Users should be careful in selecting the industry program they attend. The history of the program, session descriptions and outlines, speaker biographies, course materials, sponsor guarantees and cost all play a major role in the quality of industry conferences.

Most conferences will meet user criteria; some will not. The user must be smart in selecting which industry conferences to attend. But the overall trend in industry conferences, as with the industry itself, is toward listening to users and providing the focused education today's users need.

Standards from **page 22**

the standards are not yet in place. Several of the presentations at ICC '86 helped bring that contradiction into focus.

What's happening now? In parts of Europe and Asia, there are various pre-ISDN services in commercial operation. Typical is British Telecom's Integrated Digital Access, which offers transmission rates of 64K bit/sec for voice or data, 8K bit/sec for data and 8K bit/sec for signaling, over standard local loops. One speaker called that format, "B plus little B plus little D." In the U.S., PacTel Communications Systems' Project Victoria provides two voice connections and up to five data channels. These services are more pseudo-ISDN than pre-ISDN, but they serve the purpose of testing the market for integrated services.

What's going to happen soon? The North American ISDN trials are the next big center of attention. All seven regional Bell operating companies, plus Bell Canada, have announced trials for the late-1986 through late-1988 season. With multiple trials in many companies, there will be about 16 trials in all. At ICC '86, Olga Mitchell of Bell Communications Research, Inc. (Bellcore) divided these trials into two groups:

- Island trials will use a single central office switch. For the most part, these will involve "2B + D" offerings — two 64K bit/sec information channels and a 16K bit/sec signaling channel, over twisted-pair wire from the central office.
- Interworking trials will attempt to link several central office switches, usually from different manufacturers, using Common Channel Signaling System 7.

These trials will provide a fuller test of true ISDN functionality than the pre-ISDN services, but they still won't be true ISDN. This is because the standards-setters in the Consultative Committee on International Telephony and Telegraphy haven't yet decided exactly which physical technology should be used to deliver "2B plus D," nor which protocol should be used to maintain synchronization when a series of zeros must be transmitted.

So, each of the trials will use a form of proprietary interface to provide digital links to user premises. This sounds ominous for the standardization process, but all of the manufacturers are very loud in their promises to implement whatever standard is eventually approved. Keep your fingers crossed.

What remains for the future? Future developments in ISDN were discussed by virtually every speaker, with concerns falling into two general categories: When will the standards be completed? And is anyone going to buy this stuff?

Under the heading of completing standards, seven papers at a standards session gave hope that many contentious problems would be sorted out in working group meetings this year, leading to fairly comprehensive standards at the CCITT Plenary meeting in 1988. In addition to the problems described above, the standards bodies must resolve such issues as what numbering plan to use. This is particularly difficult for data calls that might pass through an ISDN network, an X.25 packet network and an analog telephony network before reaching their destinations. A related subject was the availability of terminals. Bob Aaron of AT&T Bell Laboratories called terminals the orphans of ISDN. Despite all the trial announcements, only one company, Toshiba America, Inc. is promising ISDN terminal equipment. Many of today's voice/data terminals give new meaning to the term "ugly phone," so it will be interesting to see if anyone produces ISDN devices that people would be willing to have on their desks.

But when the discussion turned to actual customers, the talk was more optimistic. Kathleen Kaplan of Southern Bell Telephone and Telegraph Co. set the tone with her statement that they were having "no trouble finding customers." Two ISDN customers in Atlanta have already been announced and seven more are in the negotiation stage. Southern Bell is so certain of the future of ISDN that it isn't holding trials — they're called roll-outs instead.

Speakers from other telephone companies supported Kaplan's optimistic view. Joseph Miller of Mountain Bell reported that the trial customers in Denver were skeptical at first, but are now coming up with innovative approaches of their own, even "stretching our ability to provide applications," Miller said. It seems that telecom managers who get their hands near ISDN have no trouble seeing genuine value-added uses for it.

Jack MacDonald of Contel reported that many people feel that ISDN is too late for very large customers — General Motors Corp. is already putting in its own private integrated network and can't afford to wait for the CCITT to get its act together. On the other hand, Bellcore's Mitchell reported that Southwestern Bell Corp. is near agreement on an ISDN implementation involving a 12,000-station sys-

Continued on **page 34**

From **page 33**

tem in Houston.

Many speakers insisted that users must be involved in ISDN planning. There was not a single user speaker at the ISDN sessions and there were few in the audience.

But what about the supply side of the equation? Contel's MacDonald pointed out that demand will always be high for services that have no price. Can the manufacturers and telephone companies offer ISDN services and features at a price that anyone will pay?

Speakers returned many times to three price-related points:

- Users won't accept ISDN if it isn't at least as good as non-ISDN service.
- Users won't pay a premium for services that don't offer substantial additional value.
- Non-ISDN customers don't want to pay extra to subsidize the introduction of ISDN.

To anyone living in the real world of business communications, these points seem patently obvious, but it was clear that some speakers thought these were profound insights.

On the positive side, Southern Bell's Kaplan reported that her company expects it will be economical to install single-mode fiber to homes — for plain old telephone service only — by 1990, perhaps sooner. The cost of fiber and lasers is falling by 50% and more each year, while the cost of copper is rising, and Southern Bell expects the crossover to occur within four years. Two unnamed switch manufacturers have told Southern Bell that they will have systems that are able to switch 150M bit/sec optical channels by 1989. If the Atlanta-based telephone company is correct in its forecasts, fiber to every desk may soon be a reality.

The overall mood of ICC '86 was very fraternal, open and friendly. That was pleasant — but it meant that asking really tough questions was not encouraged. For example, several speakers from Northern Telecom, Inc. and its associated companies assured us that its DMS-100 ISDN would provide all of the advanced Centrex features in Northern Telecom's Integrated Business Network (IBN) package usually marketed under the name Centrex III. No one was impolite enough to point out that the IBN software is far from stable, and that DMS-100-based Centrex systems continue to experience serious performance problems, ranging from radio interference to console failures. Similarly, many confident statements were made about availability dates. But AT&T is going to be at least six months late with its ISDN software, and the industry's track record in meeting delivery dates is not great. Remember Northern Telecom's Meridian promises? Intecom, Inc.'s Lanmark? Mitel Corp.'s SX-2000? The list goes on.

It is clear that ISDN is coming. It is wise to begin preparations now, if only by putting planning procedures in place. The organizations that prepare now will be in the best position to use ISDN for competitive advantage when it arrives.

But it also is advisable to be realistic. Timetables change, and much remains to be settled.

If there is one lesson to be learned from ICC '86, it is that ISDN is coming sooner than you think — but probably not as soon as promised.

Technology from **page 22**

European firms have more experience at disaster-recovery planning than U.S. companies because social and political conditions on their continent demand it of them. Terrorism has been an unfortunate fact of European life for many years.

The Irish Republican Army in the UK, the Bader Meinhoff group in West Germany, the Basque ETA in Spain and Italy's Red Brigades — none of these groups are known for their warm regard for major commercial and governmental entities.

Another reason for Europe's head start on disaster planning is that its governments have been more willing to intervene and regulate business when they thought the social good was at stake. The emergence of data privacy legislation across Europe obligates companies that hold personal data to safeguard it from loss and misuse. In Britain, companies that have computerized information on the public must register with the government and show that they manage and protect that information properly.

A few years ago, the Swedish government surveyed top firms to determine how they would fare in the event of a loss of their main information-processing resources. The results were nothing short of shocking: Barely 15% of the companies queried would be able to survive loss of their computer centers. Since that survey, the government has required that all Swedish companies take concrete measures to protect the information resources in their charge.

Regardless of nationality, geographical location or the political climate in which they operate, all companies clearly face some risk of natural or man-made disasters. Until recently, the only viable approach to safeguarding vital data was to copy it from disk storage devices onto magnetic tape reels and then physically move the copies to a remote location. This approach, however, suffers from two fundamental weaknesses: reliance on the physical movement of tape files to a safe location and the enormous expense of manually backing up, storing and relocating the tapes.

Today, however, advances in data communications technology and in the sophistication of data management software make a new level of security possible. The National Westminster Bank in the UK, for instance, has established duplicate data centers hundreds of miles apart, which are linked with high-speed, reliable communications networks, eliminating the need to physically transport backup tapes. The bank's data management software automatically backs up all the information that has been added or changed and transmits it across the network to the remote facility.

If the firm's data center should fall victim to a terrorist's bomb or a natural calamity in the middle of the night, the remote center can automatically assume responsibility for the work of both locations. This can occur with absolutely no manual involvement in the backup and recovery procedure.

To be sure, older and less reliable disaster-recovery systems are not as expensive. No disaster-recovery system at all is even cheaper. But underestimating terrorists' knack for sniffing out vulnerability and continuing to believe that "it can't happen here," may be the costliest mistake corporate America could make.

Texas from **page 1**

cost-cutting changes to its networks. But, with oil revenues expected to drop by as much as $2.3 billion by mid-1987, the state has begun planning for change.

Texas' Automated Information Telecommunications Counsel (AITC), which handles communications and computer services planning for some 250 other state agencies, assembled the 12-member steering committee in April. The group's goal is to find ways of eliminating areas of overlap in communications services and explore methods by which agencies can more effectively share resources. The committee must also determine what actions the state will take when a low-cost, long-distance contract expires on Sept. 1, 1987.

The steering committee includes members from various state agencies and academia, as well as representatives from some of Texas' largest corporations, including Exxon Corp., Texas Instruments, Inc., Southland Corp. and Texas Eastern Transmission Corp.

The steering committee has begun work on a document — due to be completed in early December — that will recommend a 15-year plan for meeting the state's communications needs. David Karney, chairman of the AITC Steering Committee and MIS vice-president of Haliburton Corp., said the study will recommend that the state continue to lease services from AT&T Communications, Inc. and Southwestern Bell Corp. or that it purchase equipment and facilities to be used to construct a private network. Committee members are not certain yet whether the private network would offer cost advantages over current leased facilities.

The state currently leases switch capacity under a Common Channel Switching Arrangement from Southwestern Bell for some $2 million annually. The voice network, which serves roughly 250 locations, uses telephone company-owned central office switches located in Dallas, Houston, Austin and Abilene. The network, which handles eight million minutes — nearly 134,000 hours — of intrastate long-distance calls per month, uses analog transmission facilities leased from AT&T Communications to link together the four switches.

Legislation enacted in May 1985 requires AT&T Communications to continue providing bulk long-distance circuits according to the carrier's now-defunct Telpac service pricing scheme. The legislative provision, however, will be terminated in September.

The state pays AT&T Communications roughly $285,000 per month for the long-distance links and for roughly 800 circuits used to support the state's data traffic. The data circuits, which connect computers at dispersed state agencies, constitute a second network. These point-to-point and multidrop circuits are not switched through the four central office switches.

Although Karney claimed the steering committee is examining several network strategies, he said the state would not be able to migrate all network users to a new network by the time the Telpac contract expires in September 1987. "We are working to put together a transition plan that will enable the state to replace current leased facilities with whatever we consider the best permanent system to be," Karney explained.

Network management is a key concern of the steering committee. "If we recommend the state purchase a network, we will assume, in some fashion, responsibility for operating and maintaining the network," Karney asserted. The steering committee will attempt to structure a network that could be easily managed from a central site such as Austin, he said.

Users from **page 5**

"We're one of the biggest users as well as a supplier of services," said John Woods, manager of telecommunications for General Telephone Co. of the Southeast in Durham, N.C. General Telephone is a local exchange carrier. "On May 1, 1984, we had no long-distance bills. Just one month later, we owed $11 million in long-distance charges," Woods said.

According to Woods, changes wrought by divestiture have made him a devoted student of tariffs. He recommended that all users familiarize themselves with the intricacies of tariffs.

"What we do for ourselves, the customers can do for themselves." Woods said.

Consolidated Credit's Tolson agreed.

"Communications is an exciting business, but you have to know what you are doing," he said. "AT&T isn't going to come to you and tell you how to save money."

▶ MICRO-MAINFRAME

The 3-tier link evolution

BY NADINE WANDZILAK
Staff Writer

BOSTON — The continued proliferation of personal computers is spurring increased demand for host connectivity and is actually adding to, rather than reducing, the need for mainframe resources, according to speakers at a Gartner Group, Inc. seminar on systems connectivity held here last week.

The seminar focused on trends in micro-to-mainframe link and personal computer network technologies. George Weiss, program director of Gartner Group's Small Computer Systems Service, said micro-to-mainframe links have evolved from direct personal computer-to-host links into a second stage. In that stage, personal computers on local networks can access hosts through an intermediate device such as a file server, he said.

In the final stage of link evolution, Weiss anticipates the file server will embody greater intelligence and functionality, becoming a full-fledged departmental processor, which can provide host access to attached workstations. He said the migration to departmental servers and processors will simplify end-user access to corporate resources and shield the mainframe from excessive user demands.

Currently, the file server environment provides personal computer users with a raft of host access services. These include data extraction, electronic mail, file transfer and document translation among multivendor systems and virtual personal computer file storage. In the future, the departmental, intermediate devices will also be capable of providing file transfers between diverse applications such as spreadsheets and word processing systems, Weiss said.

The migration through these stages will be different for each user depending on processing environments. No one solution is better than another, Weiss said. Some users, for example, may choose a single operating system for the various processing tiers, while others may decide to link multiple operating systems and languages. While a homogeneous hardware/instruction set offers some users benefits, a heterogeneous system with standard interfaces may be better suited for others, he added.

IBM, for its part, has done little to provide users with guidance in this evolution. The company is sending mixed signals by promoting both a micro-to-mainframe link and a three-tier processing architecture, depending on the user's equipment, he said.

Connectivity choices are also affected by a company's organizational environment. Companies with multiple management layers and vertical information movement typically employ direct micro-to-mainframe links, Weiss said. On the other hand, decentralized corporate enterprises with more control at lower levels and with horizontal information movement requirements will employ the three-tiered system, he said.

▶ NETWORK TOOLS

Bridge's broadband blitz

BY MARY PETROSKY
West Coast Correspondent

Bridge Communications, Inc. has introduced a communications server it claims to be the first implementation of the Department of Defense's Transmission Control Protocol/Internet Protocol (TCP/IP) on a broadband network.

The CS/1B can link up to 32 devices, including IBM host computers, asynchronous hosts and various terminals, printers and modems. Priced at $15,600 for a 32-port version, the server is one of four broadband products unveiled by Bridge last week.

A second product, the MB/1 multiport bridge, allows Ethernet-based products access to Bridge's broadband network. It offers one broadband connection and eight Ethernet connections. In addition, an Ethernet can be connected to any of the MB/1's ports, enabling the user to construct a hybrid network with a broadband backbone and Ethernet "ribs."

If the Ethernet networks connected to the bridge also support TCP/IP, they can exchange information with the Bridge broadband network. Non-TCP/IP Ethernet networks can also use the bridge to communicate transparently across the broadband backbone, according to Bridge. The MB/1 is priced at $10,500.

A third network component, the CR/5 channel remodulator, resides at the cable head end and performs packet regeneration, frequency translation and collision detection. On collision, the CR/5 sends a jamming signal to the entire Ethernet subnetwork to ensure all stations are aware of the collision. The CR/5, priced at $5,000, works in conjunction with the RFM/5 modem to automatically readjust modem signal levels.

The $795 RFM/5 is an interface between the broadband cable and the CS/1B server. With the aid of a microprocessor, the RFM/5 continuously adjusts the transmit radio frequency signal levels to compensate for temperature variations that affect cable installations.

Washington update

■ An additional $14.6 million in AT&T Wats and 800 rate cuts, filed for on June 27, went into effect last week. The interstate service rate reductions are in addition to the $2 billion rate reductions that took effect June 1.

The newest cuts represent a 29% across-the-board reduction in Wats and 800 service rates, resulting from a decrease in the access charge that AT&T must pay to interexchange carrier GTE Corp. However, Pacific Northwest Bell is hoping to increase the access fees it charges AT&T by $23.6 million, an increase that would be passed on to users.

■ The General Accounting Office last week gave the Federal Communications Commission a big slap on the wrist, citing flaws in the methods the FCC uses to monitor the quality of local telephone service. The GAO said the FCC's current methods fail to show whether the quality of local telephone service has changed since divestiture. The GAO also noted that the FCC should be keeping track of local rates approved by state public utility commissions.

■ A group of telephone company representatives were scheduled last week to present a statement to the FCC urging an increase in end-user access charges, or fees the local telephone companies charge users for connection to long-distance networks. Current end-user charges are $2 and will be raised to $3 next year. In 1988, the fee will increase to $4.

The group is made up primarily of representatives of the National Exchange Carriers Association, the United States Telephone Association and the National Telephone Cooperative Association.

— *Karyl Scott*

802.3 from **page 1**

Although they will still have to go through multiple stages of the ratification process after this initial balloting, both of these specifications are "mature" and likely to be approved quickly, sources close to the process said.

The working paper on the low-speed AT&T Starlan look-alike is known within the committee as the "One-base-five" specification. It describes a 1M bit/sec, baseband network configured as a star that can support terminals with twisted-pair telephone wire at distances up to 500 meters.

The network access method employed is the same carrier sense multiple access with collision detection (CSMA/CD) scheme used in standard 10M bit/sec 802.3 nets, but "the physical layer has been changed to work at the lower data rate over star-configured telephone wire," explained Dave Potter. Potter is an 802 committee member and manager of I/O development for Thinking Machines Corp., a supercomputer manufacturer in Cambridge, Mass.

The One-base-five working group consists of roughly 30 people, yet AT&T did most of the technical work in adapting 802.3 to the twisted-pair wire environment. The company also verified that the technology would work, Potter said. Besides the ease of installation the One-base-five specification would lend to Ethernet-type nets, the twisted-pair wire local network is intended to break some price barriers. Don Loughry, chairman of 802.3 and standards manager for Hewlett-Packard Co.'s Information Network Group, believes network interfaces will cost as little as "a few hundred dollars," and Potter estimated connectivity costs between $200 and $300.

No one would venture a guess as to when the standard would be finalized, but Potter said it is already complete enough for vendors to build to. "I don't believe there is going to be any substantive change in what is contained in this draft and what will finally emerge as the standard," Potter said.

The Fiber-Optic Inter Repeater Link is also close to becoming a reality, observers agreed.

This standard would specify the characteristics of fiber-optic devices used to link IEEE 802.3 repeaters. A standard for the repeaters themselves was approved last December, but has yet to be published, according to Geoff Thompson, chairman of the repeater task force and an employee of Xerox Corp.'s Information Systems Division in Sunnyvale, Calif.

The Inter Repeater Link would specify the method used to link repeaters with fiber optics at distances of roughly 1,000 meters. Although repeaters can be linked today using coaxial or fiber-optic cable, the methods vary from vendor to vendor, Thompson said. The new specification would specify the fiber type, fiber size and signaling method used.

Unlike network bridges, repeaters enable 802.3 networks to be extended beyond the maximum 500-meter limitation. Bridges, on the other hand, do not repeat signals to other network segments if the device sought is on the same cable segment as the sending device, explained Maris Graube, chairman of the IEEE's 802 local network committee. Graube said that he believes products built to the Inter Repeater Link standard would be announced shortly.

Correction:

In "3274 successor bows," [*Network World*, June 23] the IBM 3174 controller was incorrectly described. The 3174 works with all IBM 3270 series devices except the IBM 3278 Model 1 terminal.

Calendar

July 7-11, Washington, D.C. — Electronic Warfare, C³ Systems. Contact: The George Washington University School of Engineering, Washington, D.C. 20052.

July 8-10, Baltimore — Hands-On Data Communications: An Advanced Approach. Also, July 14-16, Las Vegas, Nev.; July 21-23, Chicago and Sacramento, Calif. Contact: The American Institute, Inc., Carnegie Building, 55 Main St., Madison, N.J. 07904.

July 9-11, Boston — Data Communications I — Basic Concepts. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521-2939.

July 9-11, Los Angeles — Hands-On Protocols. Contact: The American Institute, Inc., Carnegie Building, 55 Main St., Madison, N.J. 07904.

July 9-11, New York — Fourth Annual PC Expo in New York. Contact: PC Expo, 333 Sylvan Ave., Englewood Cliffs, N.J. 07632.

July 10, Dallas — Manufacturing Industry Update: MAP/TOP. Contact: Infomart, Suite 6038, 1950 Stemmons Freeway, Administrative Offices, Dallas, Texas 75207.

July 10-11, Dallas — ISDN: Understanding the Technical Requirements. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521-2939.

July 10-11, Chicago — Networking the IBM PC. Also, July 14-15, Orlando, Fla.; July 24-25, Morristown, N.J.; July 28-29, Boston; Aug. 4-5, Kansas City, Mo.; Aug. 11-12, Minneapolis. Contact: The American Institute, Inc., Carnegie Building, 55 Main St., Madison, N.J. 07940.

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Aug. 4-6, Dallas — Computers, Technology and Learning. Contact: Nancy Melton, Infomart, 1950 Stemmons Freeway, Administrative Offices, Suite 6038, Dallas, Texas 75207.

Aug. 21, Dallas — Industry Update: MIS. Contact: Nancy Melton, Infomart, 1950 Stemmons Freeway, Administrative Offices, Suite 6038, Dallas, Texas 75207.

Aug. 26-28, San Mateo, Calif. — Interconnect '86: The Second Annual West Coast CPE Show. Contact: United States Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601.

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▶ PERSONALITY PROFILE

A trademark of distinction

Don Augustin looks back on 35 years.

BY PAUL KORZENIOWSKI
Senior Editor

ST. LOUIS, Mo. — Certain people come to be known by trademarks that embody personal attributes. Winston Churchill might not have conveyed such a sense of confidence if a cigarette rather than a cigar had been hanging out of his mouth. With a clean shave, Don Johnson would be just another television policeman.

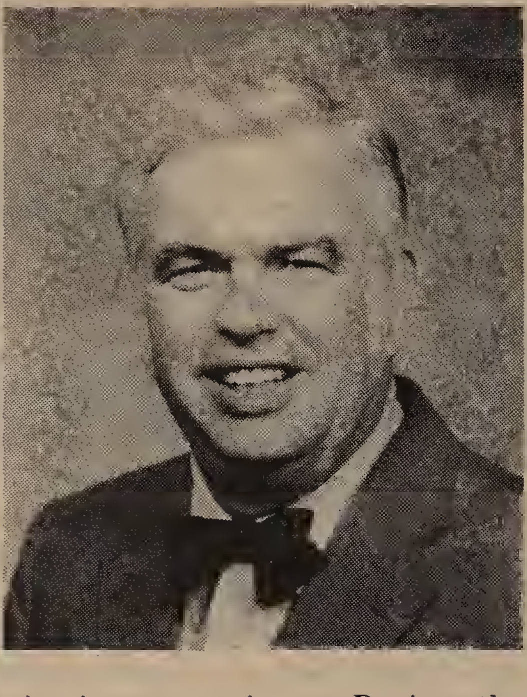
Don Augustin, director of telecommunications network services at the Aerospace Information Services division of McDonnell Douglas Corp. here, is one of a handful of people in the communications industry with his own trademark. Augustin doesn't begin his workday without donning a bow tie.

The affinity for bow ties springs from the early days of Augustin's career, which began more than 30 years ago. At that time, all electical engineers sported bow ties. "Engineers worked over drawing boards," Augustin explained. "A tie could drag across a board and disrupt an engineer's work."

Augustin's loyalty extends far beyond the unassuming bow tie. Augustin has spent most of his life in his hometown here. He married his high school sweetheart; he has worked at McDonnell Douglas for 35 years; he has had the same secretary for more than a dozen years; and, recently, his eldest daughter began working for the company. He is a man with a strong sense of commitment.

That commitment has helped Augustin rise from factory floor worker to the overseer of one of the nation's largest private communications network. During his 35-year career at McDonnell Douglas, Augustin has guided the company's technological growth, helping it move from the era of analog communications into emerging digital technologies, such as Digital Access Cross Connect systems.

His career at McDonnell Douglas stemmed more from sheer luck than from careful planning. After completing his freshman year at Northwestern University in Chicago, Augustin returned home in search of a summer job. A family friend arranged an interview at McDonnell Aircraft Co. At the company, Augustin was greeted by the head of personnel, who expected a presentation by a Northwestern professor on the benefits of a summer intern program. The embarrassing episode turned out well, however, as Augustin landed a job as a utility worker.



A stint in the U.S. Army provided Augustin with his first communications experience. During the Korean War, Augustin taught classes at a U.S. Army signaling school. The class covered long-distance communications techniques, dealing with issues such as the need for repeaters and how various types of wiring could be used.

When the war was over, Augustin put his communications experience to work for McDonnell Douglas and was given responsibility for the company's analog computer facilities. He helped develop computer systems specifications and analyzed how the systems could best be used.

The move from analog to digital technology was slow, as companies hedged their bets on the untested technology. Hybrid computer systems, which combined both technologies, emerged as a stopgap measure and were used by McDonnell Douglas. Augustin was responsible for a majority of hybrid system functions: design, transmission requirements and operation. During that time, the space program was shifting into high gear. McDonnell Douglas did a lot of development work for the government, and flight simulation programs used in preparation for the Mercury and Gemini space launches were run on the hybrid machines.

Augustin oversaw the company's computer migration as digital transmission replaced analog, and companies such as IBM, Honeywell, Inc. and General Electric Co. emerged as leading suppliers of computer systems.

In 1968, McDonnell Douglas, which had been one of the nation's largest and most sophisticated computer users, decided to enter commercial computing markets. Its first product was a time-sharing offering and Augustin assumed responsibility for the project: developing application programs, providing facilities to supply the service, marketing and sales.

The company's commercial offerings expanded rapidly and software was offered as well as timesharing. McDonnell Douglas' commercial division went through several organizational iterations and was best known as McDonnell Douglas Automation, or MacAuto.

In 1979, McDonnell Douglas officials closely examined its information systems operations in the never-ending search for ways to reduce costs. They discovered one area of overlap. MacAuto supplied communications lines, services and products to its customers. Various departments provided similar items to company employees. McDonnell Douglas officials decided that one department should supply all services and Augustin was chosen to oversee the consolidation.

Integrating the two areas was a long, arduous process that was completed last June when McDonnell Douglas installed a private network. Like many large companies, McDonnell Douglas had been purchasing communications services and equipment from a number of different vendors. Whenever a problem arose, it was difficult to identify whose equipment was at fault. By bringing services and equipment in-house, the company felt it could cut operating costs and supply better service to its users.

The decision to install a private network was made in 1981. In June 1985, the network linchpin, a private branch exchange for the company's headquarters, was installed. The network cost $58 million and supports 54,000 employees in 222 buildings scattered throughout the country.

A variety of means are used to tie employees into the network. The network backbone consists of T-1 lines connecting St. Louis, Long Beach, Calif., and Huntington Beach, Calif., offices. At each of the three locations, Northern Telecom, Inc. SL-100 PBXs route network traffic.

Voice traffic represents the bulk of the network use. However, that situation is expected to change gradually. Plans have been made to increase data traffic, and a video conferencing facility has been gaining widespread acceptance and use. A second SL-100 node will be added at the St. Louis facility, and a T-1 line supported by another SL-100 will be installed in the Mesa, Ariz., offices. A staff of approximately 200 people and an operating budget of about $60 million are needed to support the network.

In addition to an affinity for bow ties, McDonnell Douglas has furnished Augustin with a second trademark. St. Louis employees are issued an identification number and badge on their first day of work. The company founder, James McDonnell, was given badge No. 1. Augustin's number is 25,575, and approximately 200,000 additional numbers have been issued since he first came to work for the company. The badge-numbering system was one of the few things that remained constant as Augustin worked his way up to overseer of the company's elaborate private network.

System 25 from **page 1**

perception. AT&T supports data connections, but uses only standard analog telephones. Conversely, Rolm opted, with Redwood, to use mostly digital telephone sets, but will not initially support data.

Data support, according to analysts, is more important to switch users in this size class than are digital telephones. "Users in the market these vendors are targeting are sophisticated," said Spencer Rice, president of S&R Consultants in Madison, N.J. "Users in branches of large companies or professionals in small offices want advanced features. They want to be able to tie their PBX to their IBM System/36 or System/38."

The System 25 fits into AT&T's switch line above the Merlin hybrid key system/PBX, which supports up to 70 stations, and below the System 75, which supports a maximum of 800 stations.

Although it has a different architecture than the Merlin, the System 25 can support telephone equipment and some of the same features as the smaller switch, according to System 25 Product Manager Bruce Miholics.

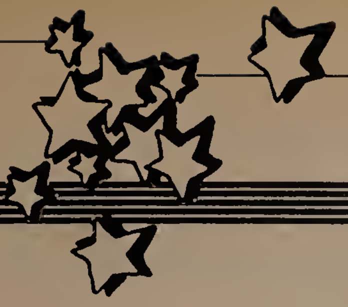
Beyond that similarity, the System 25 is a full-fledged digital PBX, Miholics said. Standard features include station message detail recording, which details phone use; least-cost routing, to ensure use of the lowest cost long-distance facilities; and floating personal dial codes, which enable users to move to different extensions and still receive calls by keying in a code.

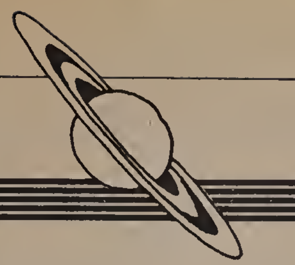
The System 25 receptionist consoles support an adjunct device with up to 100 buttons that enables direct station selection and provides lights to indicate busy extensions. A separate console button changes the group status of the 100 station buttons to enable the full 200 extensions to be addressed. The switch supports tie lines and can be used as an end point in a corporate electronic tandem network.

Although least-cost routing is a standard feature, Miholics said the System 25 is incapable of dialing the extra digits needed to access more than one carrier. It can, however, determine the least expensive service provided by any one carrier. AT&T will deliver the multiple carrier feature in mid-1987.

According to Jeff Kaplan, a senior analyst with International Data Corp., a research and consulting company in Framingham, Mass., AT&T's approach of linking the System 25 with its computers mimics the strategy Wang Laboratories, Inc. has adopted with its Wang Business Exchange (WBX). Wang is integrating the WBX with its VS minicomputer line as the Wang Integrated Office System.

Both Rice and Kaplan gave the System 25 higher marks than the Redwood. They cited data support and the line size range as its two most appealing features. One advantage the Rolm Redwood has over the System 25 is its ability to be configured as a key system. A number of states offer special key system telephone rates that are lower than standard PBX rates.





HORRELLSCOPES

BY EDWARD HORRELL

In communications today, it takes more than just good business sense to survive; it requires celestial guidance.

Aquarius: The laid-back, easygoing water bearer champions lost causes.

It's fitting that the breakup of AT&T should be presided over by an Aquarian, U.S. District Court Judge Harold Greene, born Feb. 6, 1923, the man who poured water over the burning issue of communications monopoly. This man hasn't had a moment's peace since he walked into his office and found this cosmic case on his calendar. The big planet-buster is under considerable pressure these days from both the Federal Communications Commission and the U.S. Congress.

Sen. Robert Dole (R-Kan.) thinks Greene's power is so strong that Dole is introducing legislation that would shift this power back to the FCC. Apparently, Cosmic Captain Ronald Reagan endorses this move.

Greene's critics say he is too restrictive, while supporters argue he's been open-minded in allowing the Bell operating companies to enter new businesses. There's no denying that Greene has been strict in keeping the BOCs out of businesses where they have no expertise — like real estate, manufacturing and computerized services.

Instead of complaining, the BOCs ought to thank him for keeping them from suicide. But some people are not satisfied unless they're orbiting where they have no business.

Critical decisions affecting the future of telecommunications are going to be coming out of Greene's chamber soon. Under normal circumstances, an Aquarian like Greene would be willing to fold up and slink into the night. However, planets with a lot of gravitational pull ought to be warned that Aquarians are strong willed. The more pressure they feel, the more they resist.

Gemini: The sign of the twins is resting over the house of Rolm Corp.

Normally, a birth is cause for congratulations. However, Rolm has spawned an offspring that isn't worthy of a private branch exchange leader.

Rolm introduced its Redwood small-scale PBX at the recent International Communications Association (ICA) conference in Atlanta. The birth of this Gemini wasn't as interesting as that of its twin — Rolm's nonexclusive distribution system.

In contrast to other manufacturers of telephone systems, Rolm has always opted for exclusive distribution rights for its equipment. If a user didn't buy from the Rolm direct office or distributor, he didn't get the product. And the product is so good, it was worth the limited selection options.

The exclusive distribution system eliminated the meteoric hassle for users that other manufacturers, notably Northern Telecom, Inc., have caused. With other companies, users had to select from a handful of vendors in a given area, and it was a crapshoot.

But with the birth of Redwood, Rolm also announced the arrival of nonexclusive distribution systems for the product. Rumors are that BellSouth Corp. will be a distributor, marking the first time a regional BOC has handled a Rolm product.

What terrible event brought about this change in Rolm marketing strategy? It's no secret that Rolm has been sucked into a black hole — make that a red hole. And parent company IBM isn't noted for putting up with unprofitable operations.

The worst career mistake a Gemini can make is to ignore the feelings of subordinates. And the double announcements of Redwood and the nonexclusive distribution system may be a twin error for Rolm.

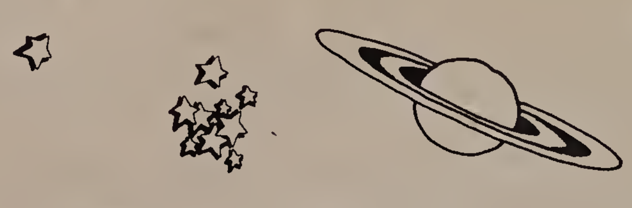
Leo: The strength of 10 lions can be found in numbers.

Users groups sponsored by manufacturers of systems are springing up all over the universe — National Rolm Users Group and AT&T's System 85 Users Group to name two.

Judging from the comments of group members, these organizations can be helpful. The strength of numbers in these groups is evident in the roaring success they've had getting the ear of manufacturer representatives.

Users should explore membership in these organizations. But be advised: Getting results depends on how many users are active. That's the strength that is needed to get the manufacturers to listen.

In addition, users should consider focus groups. Users with all sizes of equipment are in these groups, and they get together to share common problems, needs and applications.



Cosmic catastrophe of the month.

RCA asked visitors at the ICA show to qualify for prizes by having cards punched to prove that they had suffered through several sales pitches from the various divisions of RCA. The prizes: a plastic stopwatch and a painter's cap.

One user couldn't get his stopwatch to work, so he stuffed it into his sack of brochures. At 3 a.m., the alarm on the stopwatch went off. The bleary-eyed user couldn't get it to stop beeping, so he rolled it up in the painter's cap to muffle the noise enough for him to sleep again.

Other winners in the "worst prize" category include the following:

Finalco Telemanagement, for its 1-inch thick, 2-inch long stubby pencil suitable only for recording golf scores and feeding to young children who annoy you.

Network Control Corp., for its plastic squeeze flashlight, no doubt to guide people to its booth in the dark.

Ricoh Systems, Inc., for its 1-inch wide by 1-inch thick yardstick. There were only a small number of verified reports that users had bludgeoned vendors with these weapons.

Notice that none of these items have anything to do with communications. More would be accomplished by spending junk money on readable literature about products — or by giving users discounts on them.

Virgo: The fussy, tantalizing maiden remains the sign for Digital Equipment Corp.

DEC has just announced new software to help manage large-scale PBX systems. The new All-In-One package for telecommunications facilities management helps users track and report the activity of the PBX. It also speeds the billing procedures and manages cable facilities.

This is an invaluable aid for large-scale systems. It is also the top of DEC's strategy for integrating its computers with PBX systems. But DEC, the number two computer maker in the U.S., has got to be a great catch for some starry-eyed PBX manufacturer. With all the recent marriages among computer and PBX companies, what lonelier bachelor is there than Northern Telecom?

It's time DEC got together with a PBX company, but instead, it continues to flirt with connections to PBX systems.

Capricorn: The continuing low attendance at trade shows means these affairs are getting the goat of users everywhere.

Apparently, users are beginning to feel educated enough about their equipment to make trade shows unnecessary. They are becoming less responsive to the Taurus-related material at trade show booths.

This is good for users and vendors but not for trade show promoters. So many shows have sprung up that the party atmosphere has dissipated. There are no more stars in the Milky Ways of trade shows. And because of that, the quality of presentations and speakers at the shows has decreased.

Sponsors of trade shows should emphasize specialized areas when they put together a show. Generalized cattle calls just won't do it anymore. Users ought to check the agendas carefully and find out what kind of material will be available before they commit their valuable time and resources to a trade show.

Horrell is president of Mitchell & Horrell, Inc. in Memphis, Tenn.

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